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1917

PROCEEDINGS
of the
STATE HORTICULTURAL
ASSOCIATION OF
PENNSYLVANIA
for
1917

FIFTY-EIGHTH ANNUAL MEETING
HELD IN HARRISBURG
JANUARY 23, 24 *and* 25

State Horticultural Association of Pennsylvania Officers for 1917

PRESIDENT

W. J. LEWIS, Pittston, Pa.

VICE-PRESIDENTS:

P. S. FENSTERMACHER, Allentown. F. H. FASSETT, Meshoppen.
GEO. W. KESSLER, Tyrone.

SECRETARY:

F. N. FAGAN, State College.

TREASURER:

EDWIN W. THOMAS, King of Prussia.

VICE-PRESIDENTS CERTIFIED FROM THE COUNTY ASSOCIATIONS:

(Presidents of County Associations for Current Year.)

Adams, C. A. GRIEST; Bedford, J. CLYDE BIERLY; Blair, LYNN A. BRUA;
Cambria, ABRAM HOSTETLER; Chester and Delaware, SAMUEL L. BRINTON;
Lackawanna, A. B. KILMER, Spring Brook; Montgomery, IRVIN P. KNIPE;
Somerset, D. B. ZIMMERMAN; Susquehanna, J. C. MORSE; Washington, ROBERT
M. CARRONS; Wyoming, O. M. TREIBLE; Lycoming, W. H. BANZHAF.

EXECUTIVE BOARD:

(All of the above named officers.)

STANDING COMMITTEES FOR 1917:

Legislative Committee:

C. J. TYSON, Flora Dale; Dr. J. P. STEWART, State College;
HON. RALPH GIBSON, Chairman, Williamsport.

Exhibition Committee:

A. FREEMAN MASON, Chairman, State College.
C. A. WOLFE, Aspers; H. F. HERSHEY, Harrisburg; R. H. BELL, Williamsport;
GEO. W. KESSLER, Tyrone.

General Fruit Committee:

DR. J. P. STEWART, State College.

Membership in this committee is composed of one member from each county represented in the Association, and such others as the chairman may request to assist him.

Membership and Expansion Committee:

One member from each county in the State showing horticultural activity.

MEMBERSHIP

Life Members

NAME	POST OFFICE	COUNTY
Adams, W. S.	Aspers	Adams.
Anderson, H. W.	Stewartstown	York.
Anwyll, Harry L.	Harrisburg	Dauphin.
Atkinson, D. W.	Wrightstown	Bucks.
Atwater, Richard M.	Chadds Ford	Chester.
Baughner, H. G.	Aspers	Adams
Banzhaf, W. H.	Muncy	Lycoming.
Barlow, Thos. W.	Fort Washington	Montgomery.
Bartram, Frank N.	Kennett Square, Pa.	Philadelphia.
Bennett, Eugene B.	Easton, Route 3	Northampton.
Blaine, George W.	North East	Erie.
Bell, R. H.	Williamsport	
Blessing, David S.	4 N. Court St., Harrisburg	Dauphin.
Boltz, Peter R.	Lebanon	Lebanon.
Boles, McClellan T.	Hanlin Station	Washington.
Boyer, John F.	Middleburg	Snyder.
Blair, Charles P.	Monaca	Beaver.
Brinton, Wm. P.	Christiana	Lancaster.
Brinton, S. L.	West Chester	Chester.
Cation, Wm. R.	Orrtanna	Adams.
Chase, Charles T.	Bala	Chester.
Chase, Howard A.	Union League, Philadelphia	Philadelphia.
Cooper, C. A.	1000 Highland Ave., Coraopolis	Allegheny.
Corcoran, J. Paul	New Albany	
Creasy, Hon. Wm. T.	Catawissa	Columbia.
Crouse, E. A.	Gettysburg	Adams.
Cummings, Jos. F.	Sunbury	Northumberland.
Davenport, Eugene	Plymouth	
Dickson, B. M.	5711 Elgin Ave., Pittsburgh	Allegheny.
Dill, Robert	North East	Erie.
Dunlap, Jas. M.	Shippensburg	Cumberland.
Dunlap, R. Bruce	Altoona	Cumberland.
Eldon, Robert M.	Aspers	Adams.
Engle, Enos B.	Harrisburg	Dauphin.
Engle, John G.	Marietta	Lancaster.
Espe, August G.	Perryville	Allegheny.
Fassett, F. H.	Meshoppen	Wyoming.
Filbert, R. J.	Fox Chase	Philadelphia.
Fox, Cyrus T.	Reading	Berks.
Freed, A. J.	Racine	Beaver.
Freed, W. A.	Racine	Beaver.
Garrahan, R. H.	Kingston	Luzerne.
Garrettson, Eli P.	Biglerville	Adams.
Good, C. W.	Waynesboro	Franklin.
Griest, C. A.	Guernsey	Adams.
Griest, Frederick E.	Flora Dale	Adams.
Grove, W. E.	York Springs	Adams.
Haddock, John C.	Wilkes-Barre	Luzerne.
Hall, L. C.	Fairview	Erie.
Hartman, D. L.	Little River, Fla.	
Hartman, George R.	Biglerville	Adams.
Hartman, L. E.	Etters	York.
Hartman, Wm.	Etters	York.
Haverstick, Paul E.	Lancaster	Lancaster.
Hawkins, Chas. A.	York	York.
Heard, R. E.	Buffalo, N. Y.	
Hershey, H. F.	Harrisburg, R. R. 2	Dauphin.
Hill, William D.	North East	Erie.

NAME	POST OFFICE	COUNTY
Hoopas, Abner	West Chester	Chester.
Hostetler, Abram	Johnstown	Cambria.
Huey, S. R.	Newcastle, R. R. 3	Lawrence.
Huff, Burrell R.	Greensburg	Westmoreland.
Huff, L. B.	Greensburg	Westmoreland.
Johnston, Mrs. F. C.	Dallas	Luzerne.
Jones, J. F.	Lancaster	Lancaster.
Jones, S. Morris	West Grove	Chester.
Keller, H. M.	Gettysburg, R. 5	Adams.
Kessler, Geo. W.	Tyrone	Blair.
Kister, U. G.	Etters	York.
Koehler, Paulus E.	Monaca	Beaver.
Landis, D. M.	Lancaster, R. 7	Lancaster.
Landis, Israel	Lancaster	Lancaster.
Large, Miss Katharine S.	Orrtanna	Adams.
Lawrence, Schuyler	109 Main St., Towanda	
Lightner, Wm. A.	Landisburg	Perry.
Loop, A. I.	North East	Erie.
Lord, John	Wyoming, R. 1	Luzerne.
Macneal, Wm. H.	Parkesburg	Luzerne.
Maffet, Miss M. A.	264 S. Franklin St., Wilkes-Barre	Luzerne.
Martin, J. O.	Mercersburg	Franklin.
Mayer, Guy S.	Willow Street	Lancaster.
McClelland, J. B.	Canonsburg	Washington.
McCormick, James	Harrisburg	Dauphin.
McFarland, J. Horace	Harrisburg	Dauphin.
McKee, J. M.	Washington	Washington.
McLanahan, J. King	Holidaysburg	Blair.
Meehan, S. Mendelson	Germantown	Philadelphia.
Mendenhall, J. Howard	Glen Mills	Delaware.
Metzger, Dr. A. H.	La Fayette	Alabama.
Moon, Henry T.	Morrisville	Bucks.
Muller, Adolph	Norristown	Montgomery.
Myers, Levi M.	Siddonsburg	York.
O'Conner, Haldeman	13 N. Front St., Harrisburg	Dauphin.
Pannebaker, Wm. M.	Virgilina, Virginia	
Pierce, H. W.	Wilkes-Barre	Luzerne.
Rankin, Chas. C.	West Chester	Chester.
Reist, John G.	Mount Joy	Lancaster.
Rick, John	Reading	Berks.
Rinehart, E. S.	Mercersburg	Franklin.
Roberts, Horace	Moorestown, N. J.	
Robinson, A. Blaine	North East	Erie.
Rohde, Wm.	Johnstown	Cambria.
Runk, J. A.	Huntingdon	Huntingdon.
Rush, Perry M.	Sycamore, R. 1	Greene.
Satterthwaite, Fred'k G.	Fallsington	Bucks.
Searle, Alonza T.	Honesdale	Wayne.
Settlemyer, C. T.	Wilmore	
Shallcross, Frank R.	Frankford	Philadelphia.
Shank, H. L.	Lancaster, c/o Conestoga Stage	Lancaster.
Sharpe, Miss E. M.	Accotink, Va.	
Smedley, Samuel L.	2442 Bryn Mawr Ave., West Philadelphia	Philadelphia.
Snively, H. H.	Willow Street	Lancaster.
Stem, Dr. J. C.	Lemoyne	Cumberland.
Stewart, Dr. J. P.	State College	Centre.
Strasbaugh, E. F.	Orrtanna	Adams.
Swank, Luke H.	Johnstown	Cambria.
Taylor, Ralph S.	325 N. Matlack Ave., W. Chester	Chester.
Thomas, Chas. L.	King of Prussia	Montgomery.
Thomas, Edwin W.	King of Prussia	Montgomery.
Trexler, Harry C.	Allentown	Lehigh.

NAME	POST OFFICE	COUNTY
Tyson, Chester J.	Flora Dale	Adams.
Tyson, Edwin C.	Flora Dale	Adams.
Tyson, Wm. C.	Guernsey	Adams.
Walton, Robert J.	Hummelstown	Dauphin.
Weaver, Abram	Windber	Somerset.
Weimer, E. A.	Lebanon	Lebanon.
Wertz, D. Maurice	Waynesboro	Franklin.
Wertz, Geo. M.	Johnstown	Cambria.
Westrick, F. A.	Patton, R. 2	Cambria.
Whisler, Edgar	Etters, R. 1	York.
White, Arthur H.	Pulaski	Lawrence.
Williams, Irvin C.	Royersford	Montgomery.
Wister, John C.	Germantown	Philadelphia.
Witherow, R. T.	Punxsutawney	Jefferson.
Wolfe, Chas. A.	Aspers	Adams.
Woods, Edward A.	Frick Bldg., Pittsburgh	Allegheny.
Youngs, L. G.	North East	Erie.

Annual Members

Acker, G. Norman	West Chester.
Aurand, Mrs. Charles M.	Lewistown.
Atwater, C. G. (The Barrett Co.)	17 Battery Place, New York.
Balthaser, James M.	Wernersville, R. D.
Barnard, C. P.	North Brook.
Backus, Harry	North East.
Beaver, Jas.	Mifflinburg.
Beck, John A.	White Deer.
Bedell, G. H.	Waynesburg.
Berks County Farm Bureau	Reading.
Blackburn, Elmer C.	West Chester.
Biter, W. F.	Cresson, Route 1—Box 16.
Botscheller, A. B.	Dalton, R. D. 2.
Bowers, E. C.	East Petersburg.
Boyer, Ira C.	Middleburg.
Bream, D. M.	121 Hoerner, Harrisburg.
Brinser, E. C.	Middletown.
Brinser, Ephriam	Falmouth.
Brinton, H. C.	Hanover.
Broadbent, G. C.	1725 Pacific St., Philadelphia.
Brogdon, W. B. & Son	Springdale, Ark.
Brown, Wm.	2108 Myrtle St., Erie.
Bucher, F. S.	Lancaster.
Bucher, J. Reily	Lebanon.
Chambers, E. A.	1545 N. 59th St., Philadelphia.
Chapin, Irwin	Shickshinny.
Cherrington, Ira C.	Catawissa, R. D. 2.
Church, James	Royersville.
Cope, Francis R.	Dimock P. O., Susquehanna Co.
Corson, Walter H.	Plymouth Meeting.
Coursen, I. H.	Wyoming, R. D. 3.
Cox, J. W.	Newcastle, R. D. 5.
Cumberland Nurseries, E. B. Drake, Mgr.	Winchester, Tenn.
Davis, Dr. G. G.	1814 Spruce St., Philadelphia.
DeWitt, J. A.	Falls, Wyoming Co.
Deming Company, The	Salem, Ohio.
Dickenshead, Fred S.	Zionsville.
Diehl, Edw. B.	St. Thomas.
Dimit, B. H.	Beaver Co. Farm Bureau, Beaver.
Dulles, John Welsh	West Chester.
Elder, Geo. K.	Lewiston, Maine.
Ellis, David M.	Bridgeport.
Estabrook, F. L.	Athens.

Fagan, F. N.	State College.
Fassett, Wallace	Mehoopany.
Felty, G. B. O.	Millersville.
Fenstermacher, P. S.	Allentown.
Fletcher, S. W.	State College.
Fluck, A. C.	Riegelsville.
Ford, A. E.	Glen Riddle.
Fry, John L., c/o C. K. Whitmer Co.	Reading.
Funk, Sheldon W.	Boyertown.
Gay, G. E. & Son	Dallas.
Gibson, Ralph	Williamsport.
Gillan, R. J.	St. Thomas.
Gohl, Wayne B.	Williamsport.
Good, Martin R.	Blue Bell.
Goshorn, Taylor L.	Quinsy.
Green, Jr., James	Creighton.
Gross, Edward J.	Dept. of Parks & Public Property, Harrisburg.
Garver, H. B.	Middletown.
Haase, Herman	Brooklyn, N. Y.
Hadley, C. H., Jr.	State College.
Haines, Mary M.	Cheltenham.
Harman, T. D., Jr.	110 Shady Ave., Pittsburgh.
Harshman, W. W.	Waynesboro.
Hawkins, E. B.	Delta, R. D. 3.
Heilman, R. P.	Emporium.
Heisey, S. O.	Greencastle, R. D. 5.
Hile, Anthony	Curwensville.
Herr, John D.	216 N. Duke St., Lancaster.
Hershey, H. F.	East Petersburg.
High, John S.	Norwood, Del. Co.
Holdridge, F. L.	Tidionte.
Howe, Homer B.	Wellsboro (Scranton Life Bldg., Scranton).
Hunsicker, Chas. O.	1328 Turner St., Allentown.
Johnston, A. M.	Freeport Bank, Freeport.
Kauffman, J. B.	York, R. D. 7.
Kelly, W. C.	State College.
Kerr, S. W.	Stony Creek Mills.
Klahre, J. E.	95 Francis Ave., Akron, Ohio.
Knoebel, E. M.	Sunbury.
Koons, W. C.	Newville.
Kunkel, Jonas	Orwigsburg.
Kunkel, N. J.	Orwigsburg.
Leighton, James G.	Tunkhannock.
Leonard, F. E.	Carlisle, R. D. 1.
Leonard, G. F.	Hart, Michigan.
Leshner, H. W.	Northumberland, R. D. 1.
Leslie, W. H.	Arnold, R. D. 1.
Lewis, W. J.	Pittston, R. D. 1.
Loy, W. G.	Newport.
Loose, H. H.	Menges Mills.
Maloney Bros. & Wells Co.	Dansville, N. Y.
Marble, L. M., c/o Belmar Mfg. Co.	Canton.
Markey, Elmer J.	York, R. D. 2.
Mastin, W. H.	Newark, N. J.
Mason, A. Freeman	State College.
Mechling, Edward A.	Moorestown, N. J.
Meyer, David H.	Annville.
Meyer, Henry T.	Lewisburg.
Miller, Amos E.	Hanover.
Miller, E. M.	Hanover.
Minnick, D. N. & Bro.	Chambersburg.
Minter, D. G., Mrs.	Arendtsville.
Mitchell, Ehrman B.	Beaufort Farms, Harrisburg, R. D. 3.
Moon, James M.	Moorestown.

Moon, R. Barclay.....Morrisville.
 Moyer, Samuel.....Hershey.
 McCoon, Erwin.....Towanda.
 McDowell, M. S.....State College.
 McHenry, G. L.....Benton.
 McWilliams, H. C.....Ebensburg.
 Nagle, Edw. A.....1200 Washington St., Easton.
 Newcomer, Aaron.....Smithsburg, Md.
 Newcomer, W. S.....Glenn Rock.
 Nolt, Harrison S.....Columbia, R. D. 1.
 Oakwood Co.....York Springs.
 Oyler, Geo.....Gettysburg, R. D. 5.
 Peck, Wm. H.....3d National Bank, Scranton.
 Peirce, E. F.....Swarthmore.
 Pershing, Theo.....Pineville, Bucks Co.
 Peters, Wallace V.....Guernsey.
 Philips, L. R.....Spraggs, Green Co.
 Pratt Co., B. G.....50 Church St., New York.
 Prickett, J. W.....Aspers.
 Raby, J. B., Jr.....York, R. D. 6.
 Raffensberger, Roy M.....Biglerville, R. D. 2.
 Raffensberger, Chas. E.....Arendtsville.
 Rankin, W. E.....Hickory, R. D. 1.
 Rawding, Henry.....Moscow, R. D. 2.
 Reife, Jacob F.....Camp Hill.
 Riedy, Miss Ida M.....926 Washington St., Easton.
 Reiter, F. G.....Mars.
 Rice, Daniel.....New Bloomfield.
 Rittenhouse, S. B.....Lorane.
 Rittenhouse, J. S.....Lorane.
 Roberts, Arthur.....McKnightstown.
 Roeber, Henry.....Wayne.
 Rohland, Otto.....Narrowsburg, N. Y.
 Root, J. W.....Manheim, R. D. 1.
 Row, O. S.....Williamstown.
 Ruhl, H. F.....Manheim.
 Rupp, Harry D.....Rupp Bldg., York.
 Saylor, Clayton R.....391 N. Evans St., Pottstown.
 Schautz, M. P.....Allentown.
 Schmoll, G. F.....Wyoming.
 Sergeant, Geo., Jr.....Glen Mills.
 Shay, M. E.....Holmesburg.
 Sharon Fruit Farm, J. H. Jones, Mgr.....Newport.
 Shearer, Walter J.....Vinemont.
 Shorb, Albert.....Hanover.
 Siegler, Franklin.....320 S. 44th St., Philadelphia.
 Silvis, Bert W.....Export, R. D.
 Smedley, Walter.....904 Stephen Girard Bldg., Philadelphia.
 Smith, C. M.....Lewistown.
 Smith, H. D.....Downington, R. D. 2.
 Snavely, R. J.....Lebanon, R. D. 2.
 Snyder, E. Bane.....Jacks Mountain.
 Spencer, C. A.....Woodville.
 Stewart, Wm.....Landisburg.
 Stein, Geo. E.....Wrightsville.
 Stitzer, Clyde E.....Millmont, R. D. 1.
 Stock, Grover C.....Wyoming.
 Stover, F. S.....Bowmansville.
 Strain, Thomas.....Merchantville, N. J.
 Strode, A. Darlington.....West Chester.
 Surface, H. A., Dr.....Mechanicsburg.
 Swatz, Samuel.....Spring Grove.
 Taylor, H. E.....Chicora.
 Thomas, J. E.....Avalon.

Thomsen Chemical Co.....Baltimore, Md.
 Tinn, A. O.....Forest City, R. D. 1.
 Tyler, W. D.....Dante, Russell Co.
 Turk, J. C.....Euclid, Butler Co.
 Vogel, A. B.....Lancaster, R. D. 3.
 Wadhams, Lydia F.....275 S. Franklin St., Wilkes-Barre.
 Weigel, H. M.....Harrisburg.
 Wetzel, Louis.....Dauphin.
 Wickersham, R. A.....Mechanicsburg.
 Wilson, Capt. J. L.....Overbrook.
 Wingert, J. K.....Chambersburg.
 Wittmer, Geo. W., Jr.....Allison Park, R. D.
 Wood, R. S.....Lancaster, Box 208.
 Woodruff, N. W.....Woodruff.
 Woolman, Anna.....Lansdowne.
 Wuedle, Francis.....West Chester.
 Yeager, A. F.....State College.

Vegetable Growers' Section

OFFICERS:

S. HERBERT STARKEY, Chairman, Bustleton, Pa.
 J. R. BECHTEL, Secretary, State College, Pa.

MEMBERSHIP:

Arnold, H. F.....Beaver Falls, R. D. 4.
 Atkinson, D. W.....Farm Bureau, Media.
 Baker Estates.....Altoona.
 Bechtel, J. R.....State College.
 Berks County Farm Bureau, C. S. Adams.....Reading.
 Comly, N. M.....Bustleton.
 Crone, M. C.....Wellsville.
 Crutchfield & Woolfolk.....Pittsburgh.
 Evans, W. H.....Plainsville.
 Fleming, T. H.....Andalusia.
 From, W. H.....Sinking Springs.
 Garrahan, R. H.....Kingston.
 Keystone Bone and Fertilizer Co.....Reading.
 Lewis, Edw. W.....1200 Elmond St., Williamsport.
 Lovett, R. P.....Fallsington.
 McGowan, P. A.....Williamsport.
 Masates, A. W.....Beaufort Farms, Harrisburg.
 Pierce, H. W.....Box 196, Wilkes-Barre.
 Prout, John.....Pottstown.
 Rennard, George.....Alderson.
 Rupert, C. L., & Sons.....Bloomsburg.
 Selby, H. W.....114 Callowhill St., Philadelphia.
 Smith, G. E.....Allentown, R. D. 3.
 Stamm, Samuel.....Freeport.
 Starkey, S. Herbert.....Bustleton.
 Spencer, C. A.....Woodville.
 Therkildson, W. F., W. Atlee Burpee & Co.....Philadelphia.
 Walton, R. J.....Hummelstown.
 Watts, J. P.....Curwensville.
 Watts, R. L.....State College.
 Weinschenk, W. H.....New Castle.
 Wolper, D. L.....Norristown, R. D. 3.
 Wrightstone, N. E.....Camp Hill, R. D. 1.
 Zuck, F. J.....Erie.

CONSTITUTION

ARTICLE 1.—*Name and Object.* The name of this organization shall be The State Horticultural Association of Pennsylvania. Its object shall be to foster and encourage the development of horticulture in the State of Pennsylvania.

ARTICLE 2.—*Membership.* Any person may become an Annual Member of this Association by paying two dollars (\$2.00) to the Secretary, such membership to expire on the first day of the following annual meeting, unless renewed. Any one paying twenty dollars (\$20.00) to the Secretary at one time shall be entitled to Life Membership. Persons of distinguished merit in horticulture may be elected to Honorary Membership for the *current year*, by a majority vote of the members present at any regular meeting.

ARTICLE 3.—*Officers.* The officers shall consist of a President, three Vice-Presidents, a Secretary and a Treasurer, all of whom shall be elected by ballot at each annual meeting, to hold office for one year or until their successors shall be chosen, except that the retiring Secretary shall edit the report of the annual meeting at which his successor is elected. No one may serve as President for more than two consecutive terms. These *elective* officers shall constitute an Executive Board in conjunction with an additional indeterminate number of Vice-Presidents whose names shall be announced by the Secretary at the annual election of officers. These Vice-Presidents shall be the regularly elected Presidents of any County Associations, organized in Pennsylvania for horticultural purposes, whose Constitution is approved by the Executive Board, and whose income from annual membership dues during the preceding year was not less than ten dollars (\$10.00). In order to secure admittance to this Board, the Secretary of such County Association shall certify to the Secretary of the State Association that the applicant has been duly elected to serve as their President for the current year and shall also submit a statement showing number of members and amount of dues paid for the preceding year. All officers must be members of the Association in good standing at the time of their election and shall assume their duties at the close of the meeting at which they were elected.

ARTICLE 4.—*Quorum.* Twenty-five (25) members of the Association and five (5) members of the Executive Board shall constitute a quorum for the transaction of business.

ARTICLE 5.—*Standing Committees.* The following Standing Committees shall be appointed by the President to serve during his term of office: A Committee on Legislation, to consist of three (3) members; a Committee on Exhibitions, to consist of five (5) members; a Committee on Membership, to consist of one (1) member from each County in the State showing evidence of horticultural activity, and a General Fruit Committee, consisting of one from each County represented, with a general chairman of the whole, each member of the General Fruit Committee to have the privilege of appointing two assistants.

ARTICLE 6.—*Annual Meeting.* The Annual Meeting of this Association shall be held during the month of January in each year, at such time and place as the Executive Board shall determine. The regular meetings of the Association shall be closed to all persons, except paid-up members of the Association, speakers, delegates from associations outside of Pennsylvania, all ladies, and the minor sons of members.

ARTICLE 7.—*Amendments to the Constitution.* This Constitution may be amended by a two-thirds vote of the members present at any annual meeting, provided such amendment shall have been presented to the Secretary in writing at least sixty (60) days prior to time of holding the annual meeting, and by him referred to all members in connection with the announcement of said meeting.

BY-LAWS

ARTICLE 1.—*Duties of the President.* The President shall be the executive officer of the Association and of the Executive Board, and shall preside at all meetings of either body designating one of the Vice-Presidents to serve in his stead when necessarily absent. He shall pass upon all bills and accounts of the Association before they are ordered paid by the Secretary; he shall appoint all delegates to other associations and all special and standing committees of the Association unless otherwise ordered.

ARTICLE 2.—*Duties of Vice-Presidents.* The Vice-Presidents shall serve on the Executive Board and any one of them may be called upon by the President or the Executive Board to assume the duties of the Chair at any meeting. They shall also actively represent the Association in its various lines of work in their respective counties.

ARTICLE 3.—*Duties of the Secretary.* The Secretary shall be the recording, corresponding, and accounting officer of the Association and of the Executive Board; he shall incur no expenditure of a large or doubtful character without the sanction of the Business Committee; he shall secure the written approval of the President on all bills or claims against the Association before drawing his order on the Treasurer for the payment thereof; he shall attend all meetings of the Association and of the Executive Board and shall keep a faithful record of their proceedings; he shall sign all certificates of membership and all Diplomas and Certificates of Merit, awarded by the Association. All money received by him shall be promptly paid to the Treasurer. He shall have charge of the Association's books and papers and shall be responsible to the Board for all property placed in his charge; he shall be the custodian of the Seal of the Association, and shall have authority to affix same to documents when needful; he shall seek by all suitable means to secure the fullest announcement of the meetings of the Association in this State, as well as in adjacent States, when such shall be found desirable. It shall also be his duty, yearly, to prepare for publication, the Annual Report of the Association, together with such other

matter as he shall deem proper, he being aided in the selection of such matter by an advisory committee of the Executive Board. As recompense, the Secretary shall receive all necessary expenses, and such salary as may be determined by the Executive Board.

ARTICLE 4.—*Duties of the Treasurer.* All the funds of the Association shall be paid into the hands of the Treasurer; he shall disburse the moneys of the Association that shall come into his hands only upon order of the Secretary, countersigned by the President; he shall keep the moneys received by the Association for Life Memberships as a distinct fund, and shall invest the same under the advice and direction of the Executive Board, applying only the interest accruing thereon to the purpose of the general fund. Immediately upon assuming his office and before entering upon his duties, he shall execute to the Association an official bond with sufficient securities conditioned for the safe-keeping and disbursement of the moneys of the Association, and for the proper discharge of the further duties of his office, in such sum as shall be specified by the Executive Board, the premium on which shall be paid by the Association. This bond shall receive the approval of the President, and shall be deposited with the Secretary. Immediately preceding the annual meeting, he shall submit to the Executive Board a written report showing the amount of money that shall have come into his hands during the year, the sources from which it has been derived, and the disposition made of the same. This statement shall be published in the Annual Report of the Association.

ARTICLE 5.—*Duties of the Executive Board.* The Executive Board shall enact all rules and regulations for the management of the affairs of the Association, determine the salaries of its officers, and assume the control and management of its exhibitions; it shall have power to displace any officer of the Association for neglect of duty or abuse of position; shall fill all vacancies by appointment to continue until the next annual election; and shall hold at least two (2) regular sessions during the year, one of which shall occur at the time and place of the Annual Meeting of the Association. It may hold other meetings when called by the Secretary under the advice or direction of majority of the members of the Board at such times and places as may be deemed most convenient, but in all such cases, each member must be duly notified of the time, place, and object of such meeting; it shall carefully guard the interests of the Association, watch over its finances and provide for its necessities as they shall arise; it shall appoint from its own number three members, who shall constitute a Business Committee for the year, and upon which the Secretary and Treasurer may not serve; and it shall submit to the Annual Meeting, through the Secretary, such report upon the condition, general interests, and prospects of the Association as it shall judge necessary or expedient. All important measures shall be submitted to this Board, but may, by the Board, be re-submitted to the Association for recommendations.

ARTICLE 6.—*Duties of the Business Committee.* It shall be the duty of the Business Committee, upon application of the Secretary,

during the recess of the Executive Board, to advise with him as to the expediency of making any contemplated but questionable expenditure for which occasion may arise during such recess. The Business Committee shall also audit the accounts of the Secretary and the Treasurer just prior to the annual meeting and submit written report of its findings to the Executive Board.

ARTICLE 7.—*Duties of the Standing Committee.* (1) The Committee on Legislation shall inform itself in regard to such existing laws as relate to the horticultural interests of the State and bring the same to the attention of the Association, at the same time reporting any additional legislation which in their judgment is desirable; when so directed by the Association, it shall cause to be introduced into the State Legislature such bills as may be deemed necessary and shall aid or oppose any bills introduced by others which directly or indirectly affect the interests of the fruit grower.

(2) The Committee on Exhibitions shall suggest from time to time such methods and improvements as may seem to them desirable in conducting the exhibitions of the Association, as well as other fruit exhibitions throughout the State, and with the assistance of the Executive Board, shall arrange the premium lists, and have charge of all the exhibitions of the Association.

(3) The Committee on Membership and Expansion, with the co-operation of the County Vice-Presidents, shall bring the work of the Association to the attention of fruit growers throughout the State, and by such means as they deem best, strive to increase the membership.

(4) The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual and semi-annual reports.

Such other Standing Committees may be created by the Executive Board from time to time, as in its discretion may seem desirable or necessary.

All Standing Committees shall report to the Annual Meeting in January, any information of value to the Association or its members, that may have come to their knowledge during the year, as well as any scientific theories, deductions or facts that in their opinion may be useful in advancing the object for which the Association is laboring.

ARTICLE 8.—*Nomenclature.* The Association shall adopt the nomenclature of the American Pomological Society.

ARTICLE 9.—*Amendments to By-Laws.* Amendments or additions to these By-Laws may be made by a majority vote of the Executive Board at any meeting, but if objection shall be made, the same shall "lie upon the table" till the next regular meeting of the

Board. These By-Laws, or any one or more of them, may be suspended for the time, by order of a majority of all the members of the Association present and voting. A proposition in the general meeting of the Association for an amendment or addition to these By-Laws shall be referred to the Executive Board for consideration and decision but the Association may submit therewith its advice or request.

IN MEMORY

of

Dr. J. H. Mayer
Willow Street, Pa.

Jacob Shaffner
Harrisburg, Pa.

Chrman B. Mitchell
Harrisburg, Pa.

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**Former Life Members of
the Association**

PROCEEDINGS
OF THE
FIFTY-EIGHTH ANNUAL MEETING
OF THE
State Horticultural Association
OF PENNSYLVANIA

Held at Harrisburg, Pa., January 23-24-25, 1917

Board of Trade Building
January 23, 1917—2:00 P. M.
President W. J. LEWIS in the Chair

The Chairman: We will come to order. We are just a little bit late, but hereafter throughout our sessions, we will try and call the meeting to order promptly at the time stated in the program. Since the last annual meeting we were unfortunate in that our President-Elect died, and Mr. Tyson will now say a few words in memory of him.

DR. I. H. MAYER

It becomes my sad duty at this time to make official announcement of the death of our honored president, Dr. Isaac Hoover Mayer, who passed to his great reward Monday, November 13, 1916.

While not in robust health for several months, his final illness, a complication of diseases, was short, only a few days, and his death came as a great surprise and shock to his many friends.

Dr. Mayer was born in Strasburg Township, Lancaster County, November 26, 1844, of good old Pennsylvania German stock, a fact to which I have heard him refer with some pride. His early life was spent on his father's farm; later he taught school, and then took up the study of medicine and was graduated from Jefferson Medical College.

In 1880 Dr. Mayer planted three acres of apple orchard. Since that time several plantings have been made, until the total reached about 120 acres, partly interplanted with peaches and small fruits. Many of his orchard practices were unusual, but he was a thorough student and did nothing without a good reason. I have long considered Dr. Mayer one of the most careful orchardists in Pennsylvania, and I do not know of any more successful.

Dr. Mayer was a kindly, courteous gentleman, straightforward and positive in the expression of his views, but always thoughtful of the rights and feelings of others. It has been a real privilege to know him for many years and to work with him from time to time in the service of this Association.

In the death of Dr. Mayer I feel keenly the loss of a valued friend. I see before me the faces of many others who have known him well, and who must feel as I do, that no better tribute can be paid the memory of this kind friend—this faithful, energetic worker for the good of the Society, than the growth and success of the State Horticultural Association, as we can make it grow and succeed if we really try. For his memory and in honor to him, let us do our very best.

CHESTER J. TYSON.

The Chairman: Next on the program here is the annual address by the President. I want to say that I did not have very much to do with being elected President, not knowing of it until sometime afterwards, and I did not have a thing to do with the making of this program; if I had, I should have changed that annual address to read something like this—"The President's Annual Text," and I am going to give you just about a text, and not make any attempt at an address this afternoon. I do not know that I could if I wanted to, and I would not if I could, but you will notice through this program that we have lots of room for discussion on any subject presented to this body of people, and I want you all to think of a little speech that you are going to make after I get through, along the same lines I am going to suggest to you—in other words, along the line of my text. Now I have put a few apples around here. Perhaps, as President of the Association, I ought to apologize for not taking a few apples into the exhibit room, but I have been very busy and just brought these few to have here in this room where we are holding the meeting, because it seems to me, that to hold a horticultural society meeting and not have a few apples or some fruit in the room, would be like going to a minstrel show where they didn't have any music, or to a church where they didn't have any religion. I am sure we will have a better meeting because there are a few apples scattered around here; it does us all good to look at them. I am going to take for my text this afternoon—and I am going to ask you to say something, each one or as many as will, after I am through—along the line of what we might call suggestions for the good of the order. This Association is not in just exactly the shape it ought to be; it is not just

exactly in the shape that warrants us in believing it should be, in comparison with the fruit industry of this State. Figures, which have been given out quite recently by the State Department of Agriculture, show that there was produced in this State this year about 16,000,000 bushels of apples valued at about \$11,000,000. If, to this, we should add the value of the other tree fruits, such as peaches, pears, plums and cherries, it would undoubtedly bring the total up to somewhere around \$20,000,000, proving that the fruit industry in this State is quite an industry. As I go through the State, in other parts of it, studying the planting done there in the past five years and what is planned to be done in the next five years, I think I am conservative when I say that at the end of 15 years the value of Pennsylvania's fruit crop will be in the neighborhood of \$50,000,000 or \$60,000,000, if (now there the big word IF comes in), we can still maintain the present level or the past level of prices. Are we going to be able to do that? I think most of us have experienced that, in any one section, when there is an excessive crop, the prices go down, and if these figures are anywhere near correct—and other states are in the same position that we are, they are increasing their holdings and plantings very rapidly—there is going to be an abundance of fruit sometime in the future. Now I believe it is profitable for us to meet here and talk over ways of increasing production, study the insects and blights and all such things, spraying and fertilizers, but I believe it is equally important that we look a few minutes at the business side of it; I do not believe, at the present time, there is any one thing that confronts the fruit grower of Pennsylvania, of more importance than the building up of this State Association. You might ask why we should build up this Association, as it states here somewhere in the program that this is the 58th Annual Meeting of this Association. We know that our fruit interests are vastly superior or vastly larger now than they were 50 or 58 years ago when this Association was started, and yet these old pioneers who started this Association and carried it along through the years up until the present time—I am saying this with considerable shame—those old people did very much better by this Association than we are doing today. They had a stronger association, much stronger in proportion to the strength of the fruit industry in this State. Now—if for no other reason—it is a duty that we owe to these people to build up and strengthen this Association. Other states surrounding us have much better and stronger associations than we have at the present time in this State. Now, it will immediately occur to some of you that there are reasons for that, that the industry in the surrounding states is more localized and centralized than ours, but I firmly believe that Pennsylvania grows the best fruit of any state in the United States today, and I firmly believe that we can have just as good or a better association than they have in any other state in the United States, when we come to feel the necessity for it. As fruit growers, we are in this business for what we can make out of it, and if we put anything in the Association, we expect to get something out of it. What should the Association do for us and what should we do for the Association? One of the things the Association should

do for us, and will have to do in the future, if we are going to be successful, is to carry on a judicious and systematic campaign of advertising to increase the consumption of Pennsylvania fruit, not only in Pennsylvania but in all the eastern states. Another thing that the State Association should do, it should furnish us with complete crop and market reports, not once in six months and not at the end of the year, but we should have those frequently during the growing season, every month or every week or every day, if necessary to make it effective, so that we would understand thoroughly market conditions. If we have this increased production in the future, it is not going to be a matter of gross dollars but a matter of net dollars, which means that we have to cut down in the cost of production. With this end in view, I believe that this and every other association should help the fruit growers to economize. We can do it by owning our own fertilizer manufactories, our own spraying material factories and factories for the production of the general list of fruit growers' supplies, packages and all those things. To do this, would require money and take time, but the time is coming when we are going to realize the importance of these things, in my judgment. You cannot get blood out of a stone, or anything out of this Association unless you put something into it. You should at least put your time and \$2.00 per year into it, or \$20.00 for your lifetime. Not only that, but you have to go out and work for this Association; get new members and get them interested. These things I have mentioned to you that this Association, I think, ought to do for us fruit growers, cannot be done on wind. I believe it is an important question for us, I believe it is an important thing for us to build up this Association and strengthen it, and I believe that our future success in dollars and cents will be governed largely by the strength of this Association, or some similar association. We are going to make these meetings just as informal as it is possible for them to be. We are going to ask you to discuss all the questions presented here and we want you, as fruit growers, to have a good time while you are here; enjoy yourself, and if you see anybody around here that you think you have known some time in the past, go and shake hands with him and find out, and if you haven't known him, it is time you did; if you will do that, everything will go along all right. I would like to have you get the idea of being ashamed of this Association at the present time—the idea of having a great big fruit industry in this State and an association here, and having a little fruit exhibit here and a little meeting in this building and a fruit show down here 8 or 10 blocks away. I am going to call for suggestions for the good of the order. If any of you have anything to say along this line, say it here and let's see if we cannot get some enthusiasm and strength and life into this association to build it up. It is not in good shape, it is not in the shape it ought to be; we want to build it up, and I am going to ask anybody that has any suggestion to make for the good of this Association, to do it; you have plenty of time, now. I thank you. (Applause.)

Mr. Chase: This being my fortieth anniversary as a member of this Association, I feel impelled to second every word that our

Chairman has said. First, as to the fruit exhibit—many of you will recall how, in days gone by, the days that we like to look back upon, on one side of the hall there would be tables, not with a large assortment of fruit, not a large exhibit, but an exhibit of a large number of varieties showing what Pennsylvania could do in the growing of fruit. It is in no spirit of criticism that I express my regret that, as our Chairman has said, the exhibit this year is down at the other end of the town, mixed up with all sorts, sizes and kinds of agricultural exhibits, all worthy in themselves but too far away for us to really get the good of them, and I express the hope now, that in the future, whatever large exhibit the orchardists may have, they will not overlook the importance of a small display of all the leading varieties of Pennsylvania, where we can look at them after we adjourn and not, as I say, be obliged to go to the other end of the town; but I am not saying this in any spirit of criticism. The remarks, or at least the article read by our former President on the death of Dr. Mayer, carries me back forty years in the life of this Society. I can but recall those magnificent men who have passed over. I wish I could call them all, I wish I could call the roll, but I cannot do it. I wish we had permanent headquarters on which we could enroll the names of those men who have gone before, and under everyone of them we could inscribe, without reservation, that they were faithful to God, their country and their fellow men. And gentlemen, now as to the future of this organization—I do not propose to look back, but I agree with our Chairman that there is room, well, shall I say, for improvement? Yes, room for work which will get us closer in touch with the fruit growers of Pennsylvania in many ways, so that we will know what we are doing, and as our President has said, we should aim to try to grow fruit, apples and all other kinds of fruit so that they can be placed at a profit in the hands of the consumer, at a price where the masses can afford to use them. These boxes of apples, the fancy apples at \$2.00, \$2.25 and \$2.50 a box, retailing for more than oranges—no wonder that the consumption of apples has decreased. We should make a study of a less expensive package, less expensively grown fruit, of good quality and fair size, that can be placed in the hands of the consumer at a price not to exceed \$1.00 a bushel, in bushel packages. Do that, gentlemen, so it can be done at a profit, and I think we need not worry over the future of apples grown in the State of Pennsylvania. (Applause.)

Mr. Fox: Mr. President, there are a number of young men here today. Our worthy predecessor, Howard A. Chase, of Philadelphia, refers to celebrating his fortieth anniversary as a member of this Association; therefore he is forty years young in this Association. I happen to have known Brother Chase through all these years, because I can go back a little farther, and I am almost ashamed to say that I am as young as I am, when I say I became a member in 1870, 47 years ago. I wish to say just one word in regard to our late President, Dr. Mayer. In the same year that I became a member, at Lancaster, I met Dr. Mayer. He was then

WE RECOMMEND OUR ADVERTISERS

a member of the Lancaster County Agricultural Society, of which I was a member. We held monthly meetings in the court house in the City of Lancaster, and ever since then, ever since 1870 up to the time of his death on the 13th of November, last year, we have been very closely associated. We visited each other and I was at his orchard when they were in the height of their bearing, in 1909 and 1910—in 1909, when he had a production from one of his orchards of 9 acres valued at about \$600.00 an acre. I don't think it has ever been equalled in Pennsylvania, and yet that orchard had been thinned three times. Now, he believed in all modern methods of spraying, of pruning, of thinning the fruit and of raising fine fruit. He was devoted to this Society and after he took the Chair as President, I know that he wrote letters to the members asking them to try to increase the membership, and I hope that the suggestion that he made may be carried out and that we will grow to our former numbers. I remember the time when we had 500 or 600 or more members. Our membership as far as annual members goes, is now comparatively small and we should increase the membership. Thinking back over those who have been called to the Great Beyond, a number of names were mentioned by Brother Chase, and I can see in my mind's eye right now at least 100 of those who were active in years gone by, men like Thomas Meehan, the Editor of *The Gardeners' Monthly*, for years, of Germantown; Edwin Satterwaite, of Montgomery County; Casper Hill of Lancaster; John C. Hemper, of Berks; Jacob Garber, of Lancaster, and William Britton—men who have left names after them, and it is for the younger men to keep up this Association and bring in new blood, attend the meetings, and make them interesting; have our reports come out on time and have our light go before the world so it will be known that Pennsylvania is a fruit growing State, second in apple production and at the very head for fine fruit, fruit of quality, fruit of flavor. (Applause.)

The Chairman: Has anyone else anything to say along this line? We have a little time yet, I think. Now keep these questions, because they come in at certain times along through the program and pretty soon we are going to take up the general questions. Any of you who feel interested in the first twenty questions there can ask them. If that is all on the subject, we will take up these first twenty questions and you can just call for those by number, any of those you want to hear discussed at this time.

QUESTIONS

Mailed to Secretary for the 58th Annual Meeting State Horticultural Association of Pennsylvania

GENERAL QUESTIONS 1 to 20 Inclusive

1. Are unsprayed old apple trees a menace to fruit growing?
2. Peach and Apple orchards in need of commercial fertilizers. What should be used since Potash can not be obtained?
3. Tree paint of white lead and linseed oil, wheat flour as dryer. Will such paint damage tree?
4. The control of mice in the orchard.

5. Will lime sulphur spray act as repellant against mice successfully?
6. Has an effort been made to bring our native wild cherry into commercial use?
7. Has there been an effort either state or federal to give to the originators of new varieties of fruit or vegetables an advantage analagous to the rights of a patentee for an invention?
8. Has any member frequently secured full crop, half crop or no crop in plum orchards? Will fertilizers or cultivation help to secure regular crops? Is there a difference with varieties?
9. Can the bearing of Japan varieties of plums be controlled by thinning or other treatment?
10. Time to fertilize bush fruits. What is best fertilizer?
11. Cause of progressive strawberry blooming heavy and bearing but small amount of fruit?
12. Has any one thoroughly irrigated the everbearing strawberry last season and what was the result?
13. When is the proper time and how is the proper way to trim currant and gooseberry bushes?
14. Name of firm making plate and printing package labels with fruit in realistic colors?
15. Should the Starlings be exterminated?
16. Best sweet cherry varieties 1170 feet?
17. Will sweet clover improve a soil? Can it be used for a mulch?
18. Is there a law providing for the payment of \$25.00 a year by the township to landowners for tree planting along highways?
19. What can we expect from the Highway Department in the way of road shade tree planting?
20. Is the game in Pennsylvania protected by the present laws while any person has the right to hunt fox and wildcat with dogs throughout the entire year because of the bounty paid?

APPLE GROWING QUESTIONS 21 to 37 Inclusive

21. What are the best commercial apple varieties for Pennsylvania?
22. Is the stayman one of the best apple varieties?
23. Use of lime in apple orchard on red shale soil?
24. What effect has salt on young apple trees? How much should be applied to 12 year old trees?
25. Is it advisable to substitute Baldwin, King and Spy with other apple varieties in Northern and Central Pennsylvania? If so name varieties.
26. Wanted 5 varieties of newer red varieties of apples for elevation of 1100 feet.
27. Wanted 5 newer red varieties for boxing in Northern Pennsylvania.
28. Is Hendricks sweet the best winter red sweet apple, name other good sweet red varieties for Northern Pennsylvania.
29. What is our source of potash when we can not obtain commercial goods for basing trees?
30. What apple is the best commercial variety in Pennsylvania?
31. Is it wise to give up our older apple and peach varieties?
32. What are the best market garden crops to grow in young orchard?
33. Is it best to plow and cultivate the apple and pear orchard?
34. What cities domestic and abroad are the best Stayman and York markets?
35. Give best methods of pruning young Nero apple trees.
36. Winter storage for apples.
37. Is it common for Starks Delicious apple to grow uneven in size throughout Pennsylvania?

SPRAYING QUESTIONS 38 to 64 Inclusive

38. Will fall or winter spraying control peach leaf curl?
39. Will dormant pruning help to control blight?
40. Control of frog eye in apple foliage. Will late fall plowing help?
41. What is known about peach wilt?
42. Compare 8—8—50 self boiled with the Virginia hydrate lime sulphur.
43. Two weeks before ripening grapes dry up and fall off. Plums do the same, cause and control?
44. The use of concentrated lime sulphur spray in the peach orchard instead of 8—8—50 self boiled lime sulphur, during growing season.

45. The control of shot hole fungus on the sour cherry foliage?
46. Best formula for making lime and sulphur at home?
47. Has heavy bordeaux spraying any effect on the color of apples? Has it any bad effects on the cherry?
48. Young apples defoliated several times during summer, like spray burn—Cause?
49. Cause of not controlling codlin moth when regular spraying has been given?
50. Control of rose bugs?
51. Control of green aphid, on apple?
52. The prevalence of peach tree borers during the past year, best control?
53. Are apple seed chalcid and apple maggots pest in Pennsylvania orchards? Control?
54. Is lime sulphur dormant spray effective in controlling apple aphid if applied after eggs hatch and before damage will result to young foliage?
55. How can the time for the second brood of Codlin moth be exactly found out?
56. Would Codlin moth spray be more effective without lime and sulphur?
57. Two pounds, Arsenate of lead—50 gallons of water—6 pounds of stone lime—Is it a good Codlin moth spray?
58. Will scale parasites exterminate the San Jose scale? Where can they be obtained?
59. Best time to spray to control San Jose scale and leaf curl in peach orchard. Where can lime sulphur solution tester be secured?
60. How to prevent damage to 3 year old apples (500) against the 17-year locust.
61. Impartial discussion of the different leading makes of power sprayers.
62. What about dusting the apple orchard. Compare with liquid spray.
63. What about dusting the peach orchard. Compare with liquid spray.
64. Compare powdered lime and sulphur with liquid lime and sulphur.

MARKETING, GRADING, ETC.—QUESTIONS 65 to 68 Inclusive

65. NOTE—How many and what sizes should barrel and box apples be sized. How many grades? Name kind and amounts of blemishes allowed in each grade and color requirements.
66. The use and types of grading machines for peaches and apples.
67. Is there a reason why the State should not teach the grower how to grade and market fancy fruit?
68. Makes of conveyers for use in packing houses.

QUESTIONS ON PEACH GROWING 69 to 76 Inclusive

69. Will excessive growth caused by hard pruning make peach buds more subject to frost and low winter temperature?
70. Is it practical to prune peach trees in fall or winter in south-eastern Pennsylvania? What harm might result?
71. What about mulching peach trees, amount of mulch to use, if advisable?
72. A safe foliage spray for peaches for brown Rot and curculio.
73. What is the best and most economical fertilizer to use on a 5 year old peach orchard? Cover now of weeds. What about Nitrate of Soda?
74. Fertilizer for use in bearing peach orchard.
75. What is the best late peaches for September and October use commercially?
76. Cause of 4 year old peach tree bark dying at base, resulting in later death of tree?
77. What about summer pruning of the peach and apple?

The questions were taken up as follows:

A Member: No. 2.—Peach and Apple orchards in need of commercial fertilizers. What should be used since Potash can not be obtained?

The Chairman: I do not know of anyone more competent to answer that than Dr. Stewart.

Dr. Stewart: Most of my discussion this afternoon will probably bear on this question, so that it might not be well to let the cat out of the bag before that discussion appears. If we get

to our talk, why, the talk will answer the question better than I could answer it off-hand now, though, in just a word, I would say that nitrogen and phosphorous would be the things to use. The discussion will show why.

The Chairman: All right, that will be the next number on the program; we will take that up pretty soon now.

A Member: No. 4.—The control of mice in the orchard.

The Chairman: Will anyone answer that question, control of mice in the orchard?

A Member: Why not combine question No. 5 with question No. 4?

Dr. Stewart: No. 4 and No. 5.—Will lime sulphur spray act as repellent against mice successfully?

The Chairman: All right. Has anyone an answer for those questions? We will have to call on Dr. Stewart again.

Dr. Stewart: I would merely say that the method we have followed in controlling mice is to keep the ground clear around the base of the tree for a foot and a half or two feet out, then to use a wire screen which we fix down into the ground, making somewhat of a mound up about the tree, and then we use poison where those measures are not sufficient. In addition to the wire screen, we are using lime sulphur at full strength, so that in case mice do get under the screen and up inside, we will still have a chance to keep them out by means of the lime sulphur. I know one orchard in the western part of the State that has been mulched for a good number of years and has been sprayed annually with lime sulphur at practically full strength of the concentrate, and it has had no mouse injury whatever. Alfalfa is being used as the producer of this mulch, and it appears that the mouse injury is likely to be less in the presence of alfalfa than it is in the other cases, as it seems to provide some food for the mice which takes the place of the bark of the tree. Now there may be other observations in this matter; that is merely based on the majority of direct observations; these statements I have made are merely observations which are of value merely so far as they go. We use the poison on grain and put it down along with them. Of course, we have had an exceedingly severe time with mice in connection with a heavy mulch and we have not been entirely successful throughout, with all these measures I have mentioned. That sounds like a drastic program, but it is not a bit too drastic when the mice become exceedingly abundant, and you are likely to have more or less damage even then. The poison we use on grain which we worked down into the runways to kill as many of them as possible that way, by means of strychnine and syrup. We used that on chopped sweet potatoes for pine mice, but for the ordinary field mice probably wheat is as good a carrier as you can use for the poison.

Mr. Heilman: I want to relate a little experience I had. I mulched some trees pretty freely with straw and stable manure, but did not mulch close to the trees, was at least three feet away

from the trees, also had the trees protected with veneer guards, but the mice worked under this mulch down into the ground and got at the roots of the trees and followed the roots clear up to the trunk of the trees, under the guards, and girdled my trees. I lost several trees in that way during one season. Probably it would be right to say that this piece had been in meadow for some time and the mice were rather bad. The next year, then I tried the wheat soaked with strychnine and put about some of the trees, there happened to be a mouse get in a room where I was keeping some of this stuff and I closed the hole, so that the mouse was in there, and fed a little of this wheat to that mouse and know that it ate it, and that mouse would eat up the wheat and it did not die. The wheat was soaked with one ounce of strychnia in half a bushel of wheat. The strychnia was dissolved in water and mixed with molasses and the wheat was soaked in that and then dried. I tried putting this around the trees, and the next year the mice were bad where I hadn't them protected. Now I mention this experience because we have heard of this wheat business so often, and to me it was a positive failure. I then mixed some Paris green with some feed and put around the base of the tree, put a tablespoonful of that around the base of each tree down close, and I was not bothered quite so much with the mice after that. Whether that was it or whether it was the mulch had rotted more, I don't know. We hunted the mice somewhat by making little bunches of hay and would leave them around for a few days and then go after them with half a dozen boys, take up that bunch of hay, and we got a good many mice in that way, and every other row of our orchard that year was planted with corn and we killed a good many mice under the corn shocks. I think we got more that way than we did with the wheat.

Mr. Chase: I think after a good, heavy snow, having the snow packed around the trees and packed tight, so tight that the first thaw will not carry it away, is a good plan for mice. Then I have used common newspapers on young trees, four or five years out, or younger, put common newspapers around the tree, with the bottom of the paper buried in the dirt. You will be surprised how long a few thicknesses of common newspaper will last. That will protect the tree not only against mice but against rabbits. I happen to be in a rabbit section and rabbits will get out of the brush and get at the trees.

Dr. Stewart: In dealing with the mouse question, it must be remembered that there are at least two kinds of mice, one being the ordinary field mouse, which works usually on the surface of the ground and attacks the tree primarily at the base of the tree. The other is a relative of it, known as the pine mouse, which is likely to get into a piece of mulch anywhere and go right down under that mulch to the roots, as just described by Mr. Heilman. Occasionally the ordinary field mice seem to develop this habit of going deeper, however, than simply working on the surface, and it is therefore necessary to know which type of mouse you are dealing with, and adapt your measures in accordance with that. If you have pine mice, there is no amount of protection that you can put

immediately about the base of your tree that will protect the tree, none at all, and if you have pine mice, the only thing that will successfully handle them that I know of, is this poison which did not work in the case cited, and preferably on chopped sweet potatoes as a bait. That is the only thing we can now recommend as being even fairly successful against the pine mouse. The people at Washington, in a biological survey, claim to be able to poison mice in an ordinary orchard, to the point of extermination, with a comparatively small amount of bait on either wheat or chopped sweet potatoes, and they have been working on a large area through Virginia this Fall with what they claim is practically complete success with the same poison formula that Mr. Heilman has used; in fact, his methods as a whole seem to be very nearly orthodox except in the results.

A Member: What do pine mice look like?

Dr. Stewart: They look very much like the ordinary field mouse but the pine mouse has a much redder cast to its fur. Fortunately it is not so common, but I would be very glad to hear more experiences on this mouse business, because I regard the control of mice as one of the very essential things in a mulch system; that is, if we cannot control mice, then we might as well say good-bye to a mulch system; that is the real truth of the matter.

Mr. Pershing, of Berks County: I have been using poison the same way Mr. Heilman described, but I used exactly twice as much strychnine as he used, and I think that the proportion I used was what the Washington authorities recommend and I have occasion to know that it was successful to some extent, because I have found some dead mice after using it.

Mr. Kelshar, of Adams County: About five years ago I walked into an orchard about three years old, and I was surprised to find that the mice were doing a considerable lot of damage. I made up a formula of my own; I had some commercial lime and sulphur there and some pyrox and I took about a gallon of lime and sulphur, about a gallon of water and three or four pounds of pyrox and mixed it up the same as mixing white-wash. I put my men out in the field with a white-wash brush and had them white-wash the trees about eighteen inches high and I had no more trouble with those trees that winter, and I have had no trouble since, worth while, until this year. This year the mice are unusually plentiful in our section, and a man came to me in the fall and wanted to know what to do for those mice. I told him what I did. He went after them and says he has had very little trouble this winter. I have done nothing in the way of putting on the application, but that man was troubled considerably. There is one thing came to my notice on my farm; there's three dogs running loose all over this farm and they are digging all the time after mice and at my barn you can count anywhere from eight to a dozen cats, and it is not an uncommon thing to stand there and see cats come in off the field with these mice. Now the man next to me is troubled badly with mice this year and I am not troubled at all. I believe that

it will pay any man to keep a dog or two, of a small type, to dig down after these mice. This poison not only rid me of mice, but it got away with my boy's pet rabbit and a good many wild ones. That has been my remedy for the last few years.

The Chairman: What will be our next question? If, at any time through the session, you are interested in any of these questions as they are printed here, if you will call the number of the questions, we will try and have them answered.

A Member: Question No. 17.—Will sweet clover improve a soil? Can it be used as a mulch?

The Chairman: Who will answer that? You will have to answer these questions voluntarily more or less, because a good many of you I do not know.

Dr. Stewart: We have had a good deal of trouble in getting sweet clover to grow at all where we want it to grow. It grows very nicely along roadsides, on steep banks, and re-seeds itself and remains there in a great many parts of the country without any attention at all; but in the cases in which we have tried to make use of it as a permanent cover between the rows of trees, we have not had much success with it; in fact, our results have been very poor with sweet clover as a mulching proposition in orchards. It seems to be one of those plants that wants to do as it pleases. If it has a chance to grow in a place where it is left to itself, it is liable to stay there indefinitely.

Mr. Wickersham: I sowed some sweet clover last spring a year ago when I sowed the other clover in the wheat, and got clover last summer that some of it was eight feet high; a man nearly as large as I could step in two or three steps and I stepped five steps away, standing up like I am now, and he couldn't see me. If that wouldn't make mulch, I don't know what would. We took out some of the stock and estimated the weight of a single stock at four pounds; we didn't weigh any of them, but the stem was as thick as your finger; it grew so large that I didn't know what to do with it. I was afraid to leave it on the ground for fear it would draw mice. I think it is very dangerous to use on that account; to cut it two or three feet high and make it into plant food I think would be all right.

The Chairman: Is there anything else about sweet clover? Are there any other questions?

A Member: 18 and 19.—(18) Is there a law providing for the payment of \$25.00 a year by the township to landowners for tree planting along highways?

(19) What can we expect from the Highway Department in the way of road shade tree planting?

The Chairman: Is anyone familiar with that or does anyone know anything about it that can answer those questions?

Mr. Chase: As regards No. 18, I probably can answer that tomorrow. I would have to refer to the Acts of the Assembly on that. I do not think there is any specific amount of \$25.00 for planting, but as regards No. 19—with all due respect to our Highway Department officials, I am inclined to reply to that in Yankee fashion and ask "What can we expect from the Highway Department?" It may be within the province of the Highway Department to plant shade trees, but I think it is more within their province to improve our highways, if they can devise some system of doing this so that the improvement will be an improvement; but in that connection, I do think it might be well if our Highway Department could have—where the State roads go through woodland—could have the right of eminent domain back for one or two rods, whatever it might be, so that they could thin out back roads, making an open line of dirt, if you please, but permitting the air and sun to get in, so that many stretches of our roads through the woodland would not be so frightfully muddy after a rain. I doubt, in the first place, the Highway Department hasn't the money to plant trees, and if they had, I doubt if the majority of us would want to entrust the detail of planting shade trees in front of our property to men who have had as little experience in that line as the average employee of the Highway Department.

Mr. S. Morris Jones: As a supervisor, I have had occasion to look up this law in regard to the planting of trees and found that the laws were so hedged about with difficulties that no one would attempt to plant them and get the \$25.00, because it cost a great deal more to comply with the law, to get the \$25.00, than the \$25.00 would amount to. One of the greatest difficulties is that the law requires a fence to be kept on both sides of the trees until they become a certain age; you have to fence from the stock on the inside and from any depredation on the road side, and that fact alone, as you can readily see, would prevent anybody from planting trees to get \$25.00.

The Chairman: I might say that I have been in Luzerne County, which is considerable of woodland and timberland and more or less of a broken country, up hill and down and all that; I have been a supervisor twenty-five years, and I believe that any man that sets a tree within forty feet of the highway ought to be prosecuted. You are shaded and they have ice and mud and the trees are a nuisance; I'd rather build roads through solid rock than through a place that is badly filled up with trees. Is there any other question?

A Member: No. 8.—Has any member frequently secured full crop, half crop or no crop in plum orchards? Will fertilizers or cultivation help to secure regular crops? Is there a difference with varieties?

The Chairman: Who will answer that question?

A Member: The President.

The Chairman: I don't know whether I could answer that or not. We have quite a large plum orchard and have had considerable experience in growing plums. Has any member frequently secured full crops, half crops or no crops in the plum orchard? We have had all those conditions, and I guess that every man that ever tried to grow plums has had all of them, although it is pretty scarce that you won't have any crop in a well-cared for plum orchard. As to fertilizers, I would answer yes, anything that you do to a tree will have a tendency to make it produce a crop every year. Is there a difference with varieties? I suppose that means in the bearing. There certainly is; some varieties you can make bear almost annually and follow it up for ten or fifteen years, and some other varieties never bear. That is our experience in our section, under our conditions. Some bear two years out of three, and some bear three years out of four, so there is quite a difference in the different varieties in their regularity of bearing.

A Member: Which bear regularly?

The Chairman: Lombard, Bradshaw, German Prune; the Burbank are fairly regular; we never had a crop of Abundance yet.

A Member: Have you had any experience in plums developing early and rotting?

The Chairman: Yes sir, we have had that experience; some varieties are more subject to rot than others, but in a well-sprayed and well thinned orchard, we seldom have rot.

A Member: From insects?

The Chairman: Well, you get rid of them by spraying. Sometimes a hail-storm will have a tendency to puncture the skin of the fruit and let insects in.

A Member: What spray do you use?

The Chairman: Lime and sulphur. Some people say it is dangerous and I guess it is; we use it in the proportion of 1 to 100, with the addition of arsenate of lead. We do that and get away with it all the time, and we have no trouble. Sometimes people do have trouble and hurt their fruit and injure their crops.

A Member: Do you use self-boiled lime sulphur?

The Chairman: No, the concentrated solution.

A Member: Is rot worse with the European than with the Japanese varieties?

The Chairman: Some years that is so and some years it is not.

A Member: When do you apply the last spray?

The Chairman: I suppose two weeks before they start to color, to ripen.

A Member: No. 15.—Should the starlings be exterminated?

Mr. Chase: If I were going to start advocating exterminating the starling, I would say at the same time, exterminate the robin; don't exterminate the starlings, they are all right.

A Member: What do they feed on?

Mr. Chase: Oh, they will go for your cherry trees if you give them a chance, but let them have a few cherries.

A Member: No. 12.—Has any one thoroughly irrigated the everbearing strawberry last season and what was the result?

The Chairman: Will somebody answer that question that has had any experience with the ever-bearing strawberry, especially with the irrigation of it?

Mr. S. Morris Jones: I have had experience for two years. They can be kept bearing all summer without any question, if you irrigate, and if you have enough natural water they will keep on bearing without any irrigation. You can regulate it better if you do irrigate it. As a commercial question or as a commercial project, however, I doubt whether it will ever pay. They keep on bearing, but they do not bear quite prolifically enough to make it pay for the trouble; that has been my experience.

The Chairman: Has anyone else had any experience with the ever-bearing strawberry? If not, we will take up any other question you suggest.

A Member: No. 14.—Name of firm making plate and printing package labels with fruit in realistic colors?

The Chairman: Will someone give the name of that firm?

A Member: G. P. Reade, 199 Duane Street, New York.

The Chairman: It is possible that the McFarland Company here in Harrisburg would do it, or at least tell you where you could get it done. There is a firm in Rochester that makes a specialty of that kind of work.

Mr. Tyson: Stecker Lithographing Company, Rochester, New York.

A Member: No. 1.—Are unsprayed old apple trees a menace to fruit growing?

Mr. Chase: Yes.

Mr. F. H. Fassett: I think they are a menace to good fruit growing, and are a menace to orchardists in Pennsylvania getting the price they ought to for their fruit, because of the dumping of that class of fruit on our markets, giving Pennsylvania fruit a bad name. I consider them a real menace to good fruit growing in Pennsylvania.

If any member is interested in questions not taken up in the meeting, and will write the Secretary, every effort will be made to help answer them—Secretary, F. N. Fagan, State College, Pa.

WE RECOMMEND OUR ADVERTISERS

IMPROVING YIELDS IN PENNSYLVANIA ORCHARDS

J. P. STEWART, Experimental Pomologist,
State College, Pa.

What is the best method of handling the soil about orchard trees? Like most other questions, this one is best answered by referring it to the most direct and original source of information available, which in this case is the trees themselves. To do this naturally requires experiments. The experiments used, and the answers secured in Pennsylvania during the last 9 or 10 years, are largely covered in the present paper.

The first of these experiments is located in the Experimental Orchard at The Pennsylvania State College. Its object is to determine the best methods of handling the soil about a young apple tree. The experiment contains 8 different treatments, which are named in Table I. The area now covered by the first five of those treatments, or plats 2 to 6, was plowed in the fall of 1907 and prepared about as for corn in the spring of 1908, when all the trees were planted. Since then the several treatments named in the table have been followed annually. The plats consist chiefly of 45 trees each, and involve 3 varieties.

In plats 7 to 9, no tillage of any kind has been given. The trees on these plats were merely planted in the rather thin sod then occupying the ground, in holes dug with a spade, and were immediately mulched with straw at the rate of about 100 pounds to the tree. Since then the growth between the trees has been cut at least twice annually, and that obtained in the first cutting has been added to the mulch, while the second cutting has been left where it fell. In addition, the initial mulch of outside materials has been renewed by similar applications approximately every alternate year.

The soil involved is a rather heavy silt or clay loam, of limestone origin, and belongs in the Hagerstown series. It had been farmed rather heavily for many years, prior to our possession in 1907, with little or no return in the way of fertilization.

The fertilizer used in all the experiments discussed in this paper, consists of about 20 pounds to the tree of a commercial mixture containing approximately 6% nitrogen, 10% phosphoric acid (P_2O_5), and 10% potash (K_2O). The manure is applied at the rate of about 12 tons per acre. All fertilization is applied annually. The results of all treatments in the present experiment to the close of the 9th year are shown in Table I.

TABLE I—INFLUENCE OF CULTURAL METHODS ON GROWTH, YIELD AND MOISTURE, IN YOUNG ORCHARD

(Expt. 331, College Experimental Orchard, 1908-16)

Plat	Treatment	Av. Gain in Girth	Gain Over Tillage	Total Yield	Moisture Content '13	General Rank
		inches	%	lbs.	%	
2	Tillage alone.....	10.31	.....	554	10.6	8
3	Tillage and Intercrop..	11.56	12.1	1374	5.5	6
4	Tillage and Covercrop..	10.77	4.5	446	8.5	7
5	Tillage C-crop & M're..	12.39	20.2	2091	9.2	3
6	Tillage C-crop & Ftlzr..	12.02	16.6	1420	9.4	5
7	Mulch.....	12.09	17.3	2318	17.1	4
8	Mulch and Manure....	12.43	20.6	3089	18.2	2
9	Mulch and Ftlzr.....	12.88	24.9	3645	18.1	1

Varieties—Baldwin, Stayman Winesap and York Imperial, planted in 1908.

In these results, it will be noted that the plat receiving tillage alone has shown the least increase in tree growth, which is probably the most reliable basis of comparison at the present time. This low growth rate is probably connected with the hard, baked condition of the soil, practically devoid of humus, which is being developed under this treatment. The addition of annual leguminous cover-crops, however, has apparently done but little to improve the situation, as is shown by the results in plat 4. At the same time, the addition of manure or commercial fertilizer to the cover-crop treatment, in plats 5 and 6, has given very satisfactory increases in both tree-growth and fruit. It is evident, therefore, that the tillage and cover-crop treatment alone is not always sufficient to meet all the needs even of young trees, and their demands are naturally much less than those of trees in bearing.

The most interesting of the present tillage treatments, however, is the one involving the intercrop. This treatment has not only shown none of the ill-effects, which are commonly expected from intercrops, but on the other hand the trees in this plat are actually growing and bearing distinctly better than those in any of the other tilled but unfertilized treatments. Similar results on growth were obtained in Nebraska over a two-year period and reported in 1903 in their bulletin 79.

The intercrops used by us have been tilled annually, with proper fertilization for the crops, but with nothing applied directly to the trees. There would naturally be no practical objection to such direct applications, and the addition of a moderate mulch of manure or its equivalent around the trees should improve the treatment very materially. Such a plan should give practically all the benefits now shown in the cover-crop and manure plat, along with the financial returns that are possible from proper intercrops. A suitable winter cover of rye, or of rye and vetch, has also been used in the

present intercrop plat, and such a cover is desirable. Wherever tillage is available, therefore, we now believe that a proper use of intercrops, accompanied by winter covers and suitable fertilization for both trees and crops, is generally the best and most practical method of managing the soil about a young apple tree. The names of suitable crops for this purpose and a plan of rotation for them are given later.

Where tillage and intercrops are not considered practicable, however, the results in the mulched plats, 7 to 9, show that the mulching plan is likely to be very satisfactory. The mulching treatments are naturally not self-supporting, as the intercrop plan may be, under proper conditions, but thus far their total effects on the trees have averaged considerably better than any others in the experiment. With the definite appearance of yields, moreover, the advantage in net returns may also be in favor of the mulch treatment within the near future.

Similar results are shown in another experiment in the western part of the State, and also in an experiment in Ohio, as reported in their bulletin 171. The efficiency of the mulching treatment on young trees is therefore evident, and it is simply a question of economics whether it is to be given the preference over tillage and intercrops or not.

The gains from fertilization are now showing up rather strongly here, especially in the matter of yields, all of which is somewhat surprising in trees so young. The conservation of moisture is still the chief influence, however, as indicated by the generally superior yields in all the mulched plats. In this case, the actual gain from the manure has been greater in connection with tillage, while that from the commercial fertilizer has been greatest in connection with the mulch.

Results from a Young Bearing Orchard

In the next table, we have the results from a similar but larger experiment, involving trees in the early stages of bearing. This experiment was started in 1907 in Bedford County in the orchard of Joseph Sleek. The soil in this case is a very gravelly loam, derived chiefly from impure cherty limestones and calcareous shales, and is classed as Frankstown stony loam by the Federal Bureau of Soils. The stones are exceedingly numerous, but small, so that cultivation is not difficult, and the soil is commonly considered good for corn or other farm crops.

The trees were in their sixth year when the experiment was started. The early yields were naturally light, and hence only those of the last 6 years have been used in estimating the influence of the various treatments on yield. These yields cover the crops from the tenth to the fifteenth years inclusive of the trees' age. The effects on growth, however, are computed for the entire ten-year period. The results of the treatments are shown in Table II. In it and the table following, the treatments are ranked in order of excellence under the same kind of fertilization.

TABLE II—CULTURAL METHODS ON YIELD
AND GROWTH—(Expt. 219)

(Aver. An. Yields per Acre 6 Yrs., 1911-16)

Treatment	Tillage	Tillage & Covercrop	Sod-Mulch	Sod
	Bu.	Bu.	Bu.	Bu.
Without Fertilization	71.0	92.6	185.7	82.9
Rank	4	2	1	3
With Manure	232.2	178.2	240.1	154.2
Rank	2	3	1	4
With C. Fertilization	196.4	239.3	194.4	124.8
Rank	2	1	3	4

INFLUENCE ON GROWTH, 10 Years, 1907-16 inclusive

Average Gain in Trunk-girth	Inches	Inches	Inches	Inches
Without Fertilization	15.46	15.36	16.70	13.36
Rank	2	3	1	4
With Manure	18.78	17.76	19.37	17.55
Rank	2	3	1	4
With C. Fertilization	17.22	18.63	18.48	16.45
Rank	3	1	2	4

In these results, the high efficiency of the mulch treatment in improving both yield and growth is still very evident. The most striking developments, here, however, are the remarkable gains that have been produced in practically all treatments by means of fertilization. In the treatment involving tillage alone, for example, the annual yield for the past 6 years has been only 71 bushels per acre, while the mere addition of manure to this treatment has increased the yield to more than 232 bushels per acre. Similar gains are shown in other plats, but with the largest net increases occurring in connection with tillage. This apparently indicates the importance of the less soluble materials in this case, and also the need of some active incorporation of these materials into the soil in order to secure their full utilization.

The manure here has proved superior to the commercial fertilizer in three cases out of four. The average net gain throughout, however, is only about 10 bushels of fruit per acre annually and about two-thirds of an inch of increase in trunk-girth during the entire period. The real surprise, therefore, is in the fact that the present comparatively light application of commercial materials has so nearly equalled the 12-ton application of manure.

The cover-crop here has shown a gain over its absence in two cases out of three, but the total net gain from it has averaged only 3.5 bushels per acre annually. It is difficult to account for this virtual failure of the cover-crops to show important value, and even more difficult to account for the vacillation in superiority shown between tillage alone in the presence of manure, and tillage and cover-crops in the presence of commercial fertilization. Too much competition for moisture, which is needed by the trees at that same time, may partly account for the low average benefits derived from the cover-crops, but it is also probable that their actual plant-food addition is of less value to the trees than has been supposed.

The latter probability is indicated by the results of some extensive tests of green manuring made in the laboratory by J. W. White of the Agronomy Department. In these tests in the case of red clover, for example, it appears that no appreciable increase of nitrogen appeared in the soil for four months after the clover had been turned under. The soil in this case was relatively heavy, which would tend to retard the rate of nitrification, and this process may also occur considerably more rapidly outdoors than in. But even if it occurred twice as rapidly in the field, the nitrogen from clover plowed under in the middle of May would not begin to be available until about the middle of July, and the new cover-crop sown at that time would soon begin competing actively for this nitrogen as fast as it appeared. If this is the action that normally occurs in the average orchard soil of the heavier type, it is easy to see why the benefits from leguminous cover-crops annually turned under, are usually relatively slight.

The crop value of the mulch in the present experiment has been rather high, ranging from 70 to 103 bushels per acre in the three cases involved. It requires about 3 tons per acre of plant materials annually to maintain a first-class mulch in mature orchards, however, and since practically equal results are being obtained from tillage and fertilization, it is evident that only relatively cheap materials, or those that can be grown between the trees, are likely to be really preferable where tillage is readily available.

The correlation between growth and fruiting is very striking here, especially in the fertilized sections. In those sections, the rank in yield is the same as that in growth in all cases but one pair, and a very slight change in yield would bring this pair into line. The correlation in the unfertilized section has been broken up somewhat this year by the unexpectedly low yield on the plat receiving tillage alone, while its growth continues high. This may be corrected by the yields of another year.

This experiment has also furnished some interesting data on the relation of blight to rate of tree growth. In the sod plat for example, in which the growth rate, as shown in the table, is the lowest of any in the experiment, there has been practically no blight during the entire period, while in the adjacent plats, and especially in those receiving manure, the blight has often been very severe. The latter trees have been growing from 30 to 50 per cent

faster. The slowest growth, however, is not always the most resistant, as some very weak and poorly nourished trees in other locations are often seriously attacked. In general, therefore, it appears from the data now available that it is the trees of intermediate growth—neither too much nor too little—that are most resistant to the twig and canker forms of blight. If this conclusion is fully confirmed by further observations, it should aid materially in the general control of this difficult disease, although no modification in growth rate will afford protection against the blossom blight except in so far as the general sources of infection are reduced.

Results from a Mature Orchard

The next group of results have been obtained in an orchard of Baldwin and Spy planted in 1873. The orchard is located in Wyoming County about 40 miles north of Wilkes-Barre, on a light, sandy alluvial soil, technically known as Chenango fine sandy loam. This soil is unusually well supplied with moisture. The experiment involves six treatments, the results of which on yield and growth are shown in Table III.

TABLE III—INFLUENCE OF CULTURAL METHODS ON YIELD AND GROWTH—(Fassett Orchard)

Treatment	Average Annual Yields Per Acre			Average Increase in Trunk-Girth
	1908-12 Bushels	1913-16 Bushels	1908-16 Bushels	1907-16 Inches
Tillage and Cover-crop	370.0	434.5	398.7	9.35
Mulch	302.4	476.8	379.9	6.84
Tillage, Cover-crop & Manure	330.8	508.0	441.4	11.60
Mulch and Manure	453.6	653.0	542.2	8.51
Till., Cover-crop & Fertilizer	322.6	677.2	480.2	11.32
Mulch and Fertilizer	390.8	607.2	487.0	9.08

Varieties—Baldwin and Spy planted in spring of 1873.

In this case, the tillage and cover-crop treatment alone has done exceptionally well, especially during the first 5-year period. During this period it has excelled all other treatments in yield, except the mulched plats receiving fertilization. This period moreover omits the first year of the experiment. It appears, therefore, that if this experiment had been closed at the end of its 6th year, the natural conclusion would have been that the tillage and cover-crop treatment alone was ample to maintain yields here and that the addition of any kind of fertilization to it was unnecessary and unprofitable. During the next 4-year period, however, this treatment has fallen to last place in yield, and although still actually high, it is now being surpassed by from 73 to 243 bushels per acre annually, in the tilled and fertilized treatments, and by similar margins in those receiving a mulch and fertilization.

This apparently indicates distinctly greater efficiency from the cover-crops on the lighter and sandier soils, as might be expected from their more rapid rate of nitrification, but even here annual leguminous cover-crops have not been sufficient to maintain the pace indefinitely with plats that are receiving regular fertilization. In the stimulation of growth, the tillage and cover-crop treatments have been much superior to the mulched plats in all cases in the present orchard. This shows that those treatments are likely to be especially valuable in mature orchards wherever the growth is deficient. In the present case, however, the extra growth has served no useful purpose, as the trees were already full-sized, and the growth of the mulched trees seems to have been sufficient to secure full yields.

In this experiment the fertilization has had the most influence on the untilled plats, so far as yields are concerned. The continued high yields on the mulched and fertilized plats, moreover, shows that it is entirely possible to maintain full yields in a mature orchard without any tillage, when so desired. As between the manure and fertilizer used here, there is very little difference in efficiency in either yield or growth, each of them excelling the other in one of the two cases involved.

Relation of Treatment to Annual Bearing

The mere size of the yield over a given period, however, is only one phase of the problem. The steadiness or regularity of the yields is also of much importance, since this phase largely determines both the size of the thinning bills and the ability to remain on the market. The relation of the various treatments in the present experiment to this phase of the subject is shown in Table IV.

TABLE IV—INFLUENCE OF CULTURAL TREATMENT ON STEADINESS OF YIELD

(Yields in bushels per acre annually, in Expt. 221, Fassett Orchard)

Treatment	1907	1908	1909	1910	1911	1912	1913*	1914	1915	1916
	bu	bu	bu	bu	bu	bu	bu	bu	bu	bu
Tillage and Covercrop	23	467	195	505	202	481	525	512	366	335
Tillage, Covercrop & Manure	117	145	493	216	612	188	654	746	263	656
Tillage, Covercrop & Ftlzr	129	122	639	118	573	161	827	600	611	671
Mulch alone	29	221	215	391	246	439	527	438	439	503
Mulch and Manure	84	215	493	526	621	413	753	713	419	727
Mulch and Fertilizer	38	199	409	560	370	416	693	539	534	663

These figures show that some of the treatments have resulted in distinctly biennial bearing, as a rule, while others have given relatively steady and uniform yields. In general, the tillage treatments have given the former result, while the mulched plats,

*The 1913 yields are based on the Spy alone, since the Baldwins were seriously and irregularly affected by frost.

especially those receiving fertilization, have usually been very uniform. On the latter plats the yields have remained almost constantly between 400 and 700 bushels per acre for the last 8 years, although the varieties are Baldwin and Northern Spy.

From these and similar results in our other experiments, it appears to be entirely practicable to maintain relatively high and uniform yields in many orchards. To accomplish this, however, three requirements must usually be met. These requirements in general are, the prevention of excessive yields in any one year, by thinning or otherwise; the maintenance of an ample supply of plant food and moisture; and the absence of any important injury to the roots by too deep tillage or other means. When these three conditions are steadily and faithfully met, fairly regular crops should be secured under any normal conditions.

Relative Value of Various Cover-crops

Along with the experiment shown in Table I, another experiment was started in the same orchard, to get some light on the relative value of the leading annual cover-crops in promoting the growth and yield of young trees. The latter experiment included 12 annual covers with the usual tillage in the early part of the season, and one permanent cover, alfalfa, which was simply mowed about three times a season and the material largely used as a mulch around the trees. The results to the close of the ninth year are shown in Table V.

TABLE V—INFLUENCE OF COVER-CROPS ON GROWTH AND YIELD OF YOUNG APPLE TREES
(Expt. 333, College Experimental Orchard, 1908-16)

Plat	Treatment	Av. Gain in Girth	Gain Over Lowest	Bloom 1916	Total Yield	Growth Rank
		Inches	%	%	lbs.	
1.	Med. Red Clover.....	12.19	11.2	25.3	336	7
2.	Mammoth Clover.....	11.46	4.6	7.8	60	10
3.	Alsike.....	11.06	0.9	4.2	92	12
4.	Crimson Clover.....	11.75	7.2	4.7	56	9
5.	Vetch.....	12.79	16.7	7.6	55	2
6.	Cowpeas (Black).....	10.96	0.0	5.9	73	13
7.	Soybeans (Hollybrook).....	12.77	16.5	9.5	107	3
8.	Oats and Canada Peas.....	12.40	13.1	17.0	140	4
9.	Rye.....	11.77	7.4	5.6	82	8
10.	Millet.....	12.24	11.7	14.0	257	6
11.	Rape and Turnips.....	11.12	1.5	2.6	22	11
12.	Buckwheat.....	12.27	12.0	8.8	72	5
13.	Alfalfa (used as a mulch).....	13.03	18.9	37.3	288	1

Here again it is evident that the mulched and untilled trees in the permanent alfalfa plat are still in the lead in nearly all respects. This position, moreover, has been attained without the aid of any materials from outside sources, excepting the necessary manure, lime and inoculation required to get the original alfalfa

started. In fact the alfalfa has furnished all the mulch required and some surplus besides, especially in the earlier years. The mulch also has always been heavy enough to keep down most of the growth over the area containing the majority of the tree roots. This depth of mulch is probably desirable for best results with this plant because of the special affinity of growing alfalfa for both moisture and soil nitrogen.

There has also been no apparent damage from mice in the alfalfa section, and similar observations elsewhere have led to the impression that the alfalfa itself may furnish sufficient food so that the trees need not be molested. It would not be well to rely too much on this feature, but it is apparently prominent enough to attract attention. In a good soil, moreover, it is often possible to get an ample mulch and a considerable surplus of good hay besides. In other words, it makes available a combined mulch and partial intercrop system, which is especially adapted to large acreages or to places where tillage and intercrops are not available.

Another interesting result in the present experiment is the relatively high rank of the buckwheat plat. It is probable also that this plant does not require the return of its grain to the soil in order to exert its usual good effects. The grain might therefore be harvested and simply the straw be returned to the soil, thus affording the unique example of a combined cover-crop and intercrop, which is apparently not injurious to the trees.

Of the annual covers the vetch is in the lead in tree-growth, which is probably the fairest basis of comparison at present. This is not unexpected in view of its nitrogen-fixation, its shading growth-habit, and its low moisture demands. This plant is also worthy of consideration as a semi-permanent cover and mulch producer. It usually matures its seeds by the first of July or thereabouts, after which it can be cut and let lie for awhile for re-seeding. After it becomes well dried, the hay tedder can be run over it to shake out the seeds and the vetch straw can then be brought around the trees for a mulch. A light discing or harrowing after the raking may be helpful in increasing the germination for the next crop.

The soybeans, and the oats and peas have done very well on the present soil. The cowpeas on the other hand have apparently had a very poor influence on the associated trees. We are unable to give any very satisfactory explanation for this. Their greater moisture draft may be involved, or again they may not be well adapted to the heavy soil in this experiment. The millet, buckwheat, and rape when used alone, have done the best of any of the non-legumes. Their low seed cost also makes them worthy of special consideration.

General Cultural and Cropping Rotations

In view of all the facts brought out in the experiments above, we would venture to suggest the general cultural and cropping rotations shown in Table VI, for use in apple orchards where conditions are suitable. To some extent this table brings together the practical suggestions from all those preceding.

TABLE VI—CULTURAL AND CROPPING ROTATIONS FOR ORCHARDS

Year	Young Orchards	Mature Orchards
1.	Early Potatoes, followed by clover.	(a) Early tillage, followed by clover or vetch.
2.	Clover. Partly used for mulching trees.	Clover or vetch mulch (1 or 2 years).
3.	Early cabbage or corn, followed by winter cover of rye and vetch.	(b) Early tillage, followed by alfalfa.
4.	Beans, tomatoes or buckwheat.	Alfalfa, mulch (3 yrs. +)

These rotations provide for a logical succession of suitable intercrops, and also for a definite winter cover in all cases but one. This is in the winter following the fourth year of the young orchards, in which there will naturally be some residue available from the crops used. The present scheme also permits a choice between special and general crops, during the third and fourth years, to suit local conditions. The rotation can be expanded by allowing the clover to remain more than one season, if so desired, and it can naturally be contracted by omission of any of the season's assignments.

In the mature orchard, two rotations are suggested. The first is most nearly in line with present good practice. It involves less labor than the annual cover-crop system, and it also will probably permit more of the legume nitrogen to reach the trees. Where it is desired to prolong the mulch period, this can often be done simply by moderate applications of acid phosphate and occasionally of lime, to maintain the clover or other legumes used. Where still longer mulch periods are desired, the alfalfa treatment is suggested, with the accompaniment of enough tillage to renew the cover and reduce the mouse infestation. Either of these plans, if accompanied by proper fertilization for the trees, should prove very satisfactory.

A Member: What was the method of applying fertilizer? Just on top?

Dr. Stewart: There was no fertilizer used in this plot, nothing but alfalfa as a mulch about the trees; the manure and lime were used to get the alfalfa started.

A Member: How far apart were the trees?

Dr. Stewart: 32 feet one way and 36 the other.

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A Member: How did those trees bear for you?

Dr. Stewart: They are bearing the second best in the particular experiment in which they are located. That experiment involves 13 different treatments, but the bearing is not so important in these early years, in my opinion. One year's bearing is liable to change the entire ranking. The growth of these trees, though, is the greatest of the lot, and the one now ahead in bearing has made considerably less growth; it is about sixth or seventh.

A Member: Is the alfalfa sown one way or two ways?

Dr. Stewart: It is sown solid all over.

A Member: How much manure did you use to the acre?

Dr. Stewart: 12 tons annually; that is at least 50% too much; I would not advise over 8 in an apple orchard.

A Member: What kind of manure did you use?

Dr. Stewart: Ordinary stable manure.

A Member: Was it cattle manure?

Dr. Stewart: It was horse manure, largely, I do not know that it would make any particular difference.

A Member: What time of year did you apply it?

Dr. Stewart: Any time from mid-winter on until the first of May, usually though we tried to get the manure on in late winter or early spring.

A Member: Do you scatter it from one tree to another or just around the trees?

Dr. Stewart: We put it around the trees but let it extend out some considerable distance beyond the spread of the limbs, for the reason that the majority of the feeding roots will run quite a ways beyond. We tried to make the application heaviest under the outer two-thirds of the spread of the branches.

Mr. Fenstermacher: Do you expect the same results on a slope as on a level tract?

Dr. Stewart: I would expect just as good results. If I had a fairly decided slope, I would expect in a series of years, that the mulch treatments on the decided slope would show greater superiority over the tilled treatments than they do here; that is, the advantage of the mulch treatment should be greater on the sloping ground.

A Member: Does the blight affect fast growing trees more than slower growing ones?

Dr. Stewart: As a general rule, yes, this experiment brings that out most emphatically. As a general proposition, the slowest

growing trees here have always had the least blight; in fact, in the plat involving sod alone we have had practically no blight at all. Where blight becomes a factor, therefore, it is important to reduce the growth to a rather medium rate, I should say. Where trees, however, are growing too weakly, blight often seems to attack them just as severely as one that is growing too vigorously. Our conclusion from this is, that where you have to combat blight, you have to reverse many of your usual orchard operations; that is, where blight becomes a factor, you have to conduct those operations, for awhile, in such a way as to give you an intermediate rate of growth rather than the rate that may give the best yields. Of course along with that, the only really thorough-going method of handling blight is the surgical method of cutting it out and disinfecting the wounds as rapidly and as thoroughly as possible.

A Member: Have you noticed any difference in the varieties as being subject to blight?

Dr. Stewart: Oh yes, a great difference in varieties as regards blight, but the same general principles hold, that it seems to be the intermediate rate of growth that is most resistant. The York Imperial, Jonathan and Tolman Sweet are among the most susceptible to twig blight.

A Member: When is straw mostly used, in June or in July?

Dr. Stewart: As a rule, the best time to put a mulch on is when it is the cheapest, which is usually a little after threshing time. If you haven't any mulch on the ground, however, the earlier you can get it on, the better.

A Member: What cover crop did you use?

Dr. Stewart: Crimson and red clover in a good many instances, and a red clover and vetch mixture in others.

A Member: I notice that blight seems to be worse on the east and south east side; have you found it that way, and if so, why?

Dr. Stewart: I have not found it that way and I certainly would not be able to tell why. In many orchards, where blight gets bad, it has been no respecter of sides on the trees. I have seen entire trees looking as if they had been singed all over; I would not know any reason for the greater prevalence of blight on the east or southeast sides.

A Member: How far back should it be cut?

Dr. Stewart: For safety cut back at least six inches below any external evidence of the disease, and disinfect both the tools and the wounds.

A Member: What would you consider the mulch treatment?

Dr. Stewart: As we use it, it involves all the inter-growth between the trees which is cut at least twice. This growth is placed around the trees in the first cutting and is left where it falls in the

second cutting. In mature orchards, this is supplemented by three tons of outside materials annually to increase the amount of the mulch. That will not always pay, but where you can get cheap materials and where tillage is not desirable, for any reason at all, it will often pay distinctly.

A Member: Have you harvested the buckwheat?

Dr. Stewart: We have not, but I think the straw is the essential feature of benefit.

A Member: Do you cut it before it is ripe?

Dr. Stewart: Don't cut it at all, just let it go down. But in a general scheme of this kind, I would expect to get the grain out of the buckwheat somehow, either by high cutting or by cutting at the usual height and returning the straw.

A Member: How about early corn?

Dr. Stewart: Some kinds of early corn are good, and that is about the only kind of corn that could be used in the later years of an orchard.

A Member: Can't you grow clover in the corn?

Dr. Stewart: I don't know, but we have not had very good results in our attempt to do that around the college. Either the corn shades it or the competition for moisture hurts it, but it has never amounted to anything, in our experience. It might be good in some other places.

A Member: What you are showing now (Table VI), I would consider a practical treatment for a commercial orchard; I wonder whether you have a table showing results from a rotation of that sort?

Dr. Stewart: We haven't this exact series in any of our experiments, but it is a deduction from practically all the cultural experiments we have; if we had made this deduction before we started our experiments we would undoubtedly have had it included, but it has come in sight since the experiments were started.

A Member: Do you recommend that for peach trees?

Dr. Stewart: I do not know whether this would work in a peach orchard or not. We are talking about apples; I would not advise it directly for peaches, but there would be no harm in trying it out on peaches in a small way.

A Member: How much commercial fertilizer do you use in three years?

Dr. Stewart: If you get a good alfalfa mulch started, you won't need probably any fertilizer in the first ten years; after that, the amount of fertilizer will depend on the general yield of your trees. If they are yielding strongly, you could probably use some fertilizer advantageously.

A Member: How often do you have the alfalfa cut during the season?

Dr. Stewart: Three times.

A Member: What time is the first cutting?

Dr. Stewart: About the time the fungus spots begin to appear on the alfalfa. We clip it when the spot appears regardless of other conditions.

This is what happens in the mulch treatment sometimes (showing picture of mouse-girdled tree), in spite of anything you can do. That is a nice clean job, hasn't been touched with a knife, has not been dressed up at all; that is what happened to some of our mulched trees from mice.

A Member: Did you bridge-graft that?

Dr. Stewart: Yes, we bridge-grafted and then mounded them up with dirt until the grafts were entirely covered.

A Member: What percentage were successful?

Dr. Stewart: I would say that at least 90% of the bridge-grafts were successful.

A Member: What per cent of the trees?

Dr. Stewart: Practically all of the trees lived and 95% of the grafts are successful.

A Member: How early in the season should that be done?

Dr. Stewart: About the time the buds are starting, about the time ordinary whip or cleft grafting is done.

A Member: In what proportion do you have the nitrogen and phosphorus?

Dr. Stewart: The proportion I now recommend is 5 pounds of nitrate of soda and 8 to 10 pounds of acid phosphate to a mature tree.

A Member: What has been the effect of blight on those trees that you have just shown there?

Dr. Stewart: Very little effect; there is no tillage in this case, just the fertilizer; there has been very little blight there. These are York Imperials, but there has been no growth in the main portion of the orchard vigorous enough to get any important blight infection in the orchard; if it were growing all over the orchard the way these particular trees are, in spite of their large crops, we might easily have more trouble from blight.

A Member: Did you notice any influence of phosphorus and potash on the color of the fruit?

Dr. Stewart: Comparatively little, potash may have a slight beneficial influence, but not enough to warrant its expense for that particular purpose.

A Member: Did you give them a summer spray of lime and sulphur?

Dr. Stewart: Yes, all of these trees are sprayed; and the spraying is exactly the same. The only difference is that these trees have received a nitrogenous fertilizer and those have not.

A Member: What time of the year was that taken?

Dr. Stewart: Picking time, last season; practically all the foliage is still on the fertilized trees and all is off the others.

A Member: Did you find any winter injury on the fertilized trees?

Dr. Stewart: No, there has been no winter injury on either.

A Member: What form of nitrogen did you use?

Dr. Stewart: Nitrate of soda and dried blood. In experiments elsewhere nitrate of soda seems to be the best carrier.

A Member: How do you apply the lime?

Dr. Stewart: By simply spreading it on top of the ground.

In this connection I might refer to some very interesting developments that have appeared in Ohio and Oregon during the past year or so. They have found that by applying nitrate of soda ahead of the bloom, they can greatly increase the yields of fruit the same season. That is by a simple thing like the addition of 5 pounds of nitrate of soda per tree ahead of the bloom—meaning shortly after the buds start but before the blossoms come out—they have greatly increased the size and vigor of the blossoms and also the percentage of those blossoms that have set fruit. There's probably none of us who hasn't seen an orchard come out almost white with blossoms and then has been greatly disappointed to go out ten days later and find that an exceedingly small per cent of those blossoms have been worth anything. In Oregon this past season they increased the average yield of trees from less than one box to a tree to as much as ten boxes to the tree, with nitrate of soda applied last spring.

A Member: Does not that prove that pollenization by bees is not effective?

Dr. Stewart: I suppose that blossoms sometimes lack vitality and this fertilization enables them to go ahead and form fruit, when no amount of pollination will have any effect.

A Member: What if it happens to be dry at that particular time? Won't the tree fail to absorb that nitrate?

Dr. Stewart: Yes, it probably would, but the time the buds open is liable to be a thoroughly moist time of the year and will usually get an abundance of moisture to carry it down to the roots, and if the nitrogen should not get to the roots to affect the crop of the current season, it is certain to get there in plenty of

time to materially affect the crop of the following season. Our applications have been made after the time of blossom, but that seems to have been subject to distinct improvement, for at least part of the application, in the way I am just now indicating.

A Member: Is there any advantage in spraying the trees with nitrate?

Dr. Stewart: Not unless you want to make sure of getting it into the ground at once, and if you spray the ground, you get the same effect as spraying the tree.

A Member: Young trees—have you tried it on trees in their first year of bearing?

Dr. Stewart: As a rule, I would say that vigorous trees, in the early stages of bearing, will behave like the last two orchards I showed. In them, growth and the increased capacity of the tree seem to be much more important than any kind of fertilizers, but there are exceptions even to that. We have two important exceptions in our experiments; the first two sets of results that I showed this afternoon are exact exceptions to the last two in that particular respect, so that a good local test is the thing that will answer your questions far better than any amount of discussion by any person, and any person is bound to be always more or less in the dark in the fertilization of his own orchard, unless he runs something of this sort.

JOINT SESSION OF BOARD OF AGRICULTURE, PENNSYLVANIA BREEDERS' AND DAIRYMEN'S ASSOCIATION, STATE HORTICULTURAL ASSOCIATION, STATE VETERINARY MEDICAL ASSOCIATION AND OTHER ASSOCIATIONS
BOARD OF TRADE BUILDING, HARRISBURG, PA.

January 23, 1917, 7:30 P. M.

Mr. W. J. LEWIS, Chairman

The Chairman: The first speaker will be Mr. Dennis, who will show some moving pictures illustrating the work of the rural schools in Pennsylvania.

Mr. Dennis: Just one word by way of explanation; the moving pictures that will be thrown on the screen in about 30 seconds, illustrating the work of the rural community vocational schools of Pennsylvania, are by no means complete. It has been impossible in the time we have had at our disposal, to secure complete moving pictures, but we will be able to show you just enough to give you some idea of the practical work being carried out in the rural community vocational schools of Pennsylvania; notice the name, rural community vocational schools of Pennsylvania. We shall, in the moving pictures that we shall show you now, give you one phase of the work only, that is the work given to the boys. We have not had opportunity as yet to take the moving pictures of the vocational work carried on by the girls. Just one word of explanation; in these rural community vocational schools, every boy spends one-half of his time carrying on practical work, doing things instead of studying about things. The other one-half of his time he spends in the study of regular academic subjects, high school subjects, if you wish to call it that. Now the State gives liberal State aid to all communities that operate vocational schools. The State aid amounts to two-thirds of the salaries of all the vocational teachers employed by the school district, and the State gives from \$900.00 per year to \$3,600.00 per year to a school district for operating schools of this kind. You may be interested to know that this is the first time a vocational school exhibit has ever been put on at any place illustrating the work done at vocational schools. The exhibit to which I refer is in the Emerson-Brantingham Building, where the big State show is being carried out. In this room tonight are 76 boys from these schools. Each school is sending a corn judging team, consisting of two boys; they are here to compete in the corn judging contest tomorrow forenoon out at the State Corn Show. I am informed that every school has instructed these boys to bring home the bacon. They cannot all do that, but there is going to be keen competition. Somebody is going to win the prize.

The pictures were then shown and enjoyed by all.

The Chairman: The next number on our program is Orcharding and Side Lines, illustrated, by Mr. L. W. Minch, Vice-

President of the New Jersey State Horticultural Society, Bridgeton, N. J.

Mr. Minch: Mr. Chairman, ladies and gentlemen: There is one thing about the speaker tonight, it doesn't matter when he commences, he has to stop at a certain time, so you can be quite easy about my not talking very long. If I had the time, I would like to say some very nice things about your exhibit which I had the pleasure of examining this afternoon, and the fine quality of a great many of the horticulturists of this State and the agriculturists whom I know personally, and also pay a tribute to what we have just seen, that you are actually bringing things to pass among the young men of the State. There is this to be said, that our experiment stations and our different boards of research are doing most excellent things, and we are having a wonderful lot of information given us from various sources, and yet we feel it remained for somebody to take these facts and data, and from them to work on a practical basis and make a living out of the proposition. Now I am not here to solve the 101 difficulties about the farming proposition; I am here simply to say that I represent what is called the practical end of farming, the bread and butter of it, if you please, and while so many boards have some magnificent state endowments which allow them to do things by way of research and search after facts, for myself I have to work with one hand and keep the wolf away from the door, and scratch the sand with the other so as to make both ends meet in that way. So the only apology I have for appearing before you tonight is this—that we want to train our young men that there is a good living in farming; that there is something that challenges the ambition of the most worthy of our young men and women, and speaking for myself, representing as I do the sixth and seventh generations of farmers on both sides, I take great pleasure in speaking on this topic of making farming a success. I will now show you the pictures.

Secretary's Note—Mr. Minch gave a most instructive talk beside showing many interesting pictures of his South Jersey orcharding and its side lines.

The Chairman: Next on our program for this evening, and this will be the last, is Possibilities of Community Orchard Management, by A. Freeman Mason, Extension Horticulturist, of State College.

Mr. Mason: Gentlemen, I have a rather formidable bunch of papers here tonight, which I am going to use occasionally as notes, because a good bit of the talk that I am going to give is from figures and from data for which I have to rely on notes in order to bring the material before you.

When we get to talking about the possibilities of community management, we are in distinctly a co-operative field. Every time we get to talking about co-operation, we start hammering on a subject which has been hammered on so much now that it is old stuff to a great many of the men here. In taking up the subject of

community management then, if I seem to repeat what you have heard from a number of other speakers and will hear from a number of others still, why you will have to forgive me for repeating, and will have to forgive them later if they take up any of the topics which I speak about.

Now, in coming to the opportunities for community management in Pennsylvania, we are confronted with a great many different obstacles and a great many points in favor of community management as well. In the first place, day in and day out, we hear the question "What can we do to improve Pennsylvania fruit?" Why can't the ordinary farmer get as much money for his apples as he reads about the westerner, or the big grower, or the grower from some other section getting.

In the first place, we have one prime reason, and that is the average Pennsylvania orchard is small. They list us in the government reports as having the second largest number of apple-trees of any State in the United States; they rank Pennsylvania second; yet, going through our State, unless you confine your observations to some of the counties in the southeastern part of the State here, you wonder where Pennsylvania gets enough trees to make it rank second among the apple states. The answer is that the Pennsylvania trees are in the small farm orchard, 25, 50, 75 and 100 of them standing on the hillside or in the corner where you don't count them, in riding along on the train. The average Pennsylvania farmer cannot afford to buy equipment; he cannot afford to handle his orchards in a way that will bring him the returns that the large commercial grower can get, who can afford other things and the best equipment for orchard work. There is another thing, too; we must take into consideration the age and size of the Pennsylvania trees. Our grandfathers and great-grandfathers planted those trees; most of them got clear up out of bounds where it is hard to take care of them, where the fruit we do get has to be knocked down or shaken down. Understand I don't mean all the trees, but a large part of them on these ordinary farm orchards are such that we cannot produce good fruit economically; the age and size of the trees are against the farmer.

Another thing is the great range of varieties in the orchard. You go down to any farm orchard in Pennsylvania, and the farmer can give you an Astrachan, a Transparent, an Early Harvest, a Smokehouse, a Baldwin, a Spy, a King, occasionally a McIntosh, a Fallawater, a Russet—he can run the whole gauntlet in one orchard of 100 or 150 trees. He cannot handle that large number of varieties alone and get the money out of it; he hasn't enough of one variety to demand the best market. Then there is his distance from big markets and his rather unique location in respect to the local market. Now, we have plenty of small markets around the State here that will consume tremendous quantities of fruit. Those small markets are not very particular at the present time as to the quality of the fruit they get. They do not pay a big price for any kind of fruit, because they are more or less satisfied with poor fruit. If he

wants to tap the big market, the market that is particular about the quality and the size and the condition of the fruit, he has to ship that fruit a long distance, which, in his case, having only a small amount of fruit and a very small amount of each variety, is out of the question. So you see our Pennsylvania farmer has not an easy proposition when he gets to figuring out how he can get the prices for his fruit that the large grower, or the fruit grower located near the big and particular markets can get.

Now, we have certain things that go to make up the ideal fruit farm. For one thing, we have to get the proper orchard unit, the proper economical unit. We have a few bulletins out on that subject, where men have taken large acreages, or they have even taken whole states, and have, by sending out vast numbers of personal letters and questionnaires, found out just about what it is costing men to produce fruit and about what is the right number of acres to have in order to produce most economically. Most of these men will tell you that about 20 acres is the one man, one team unit—between 20 and 25 acres is the unit for one man and one team. Now that works out as a unit in one other way; you get a spray outfit, a spray rig, and you can cover around 7 acres of old trees a day. Some days you will not cover that much. If you have good conditions, you will cover 7 acres a day of good big old trees. While our spraying season usually lasts several days at each particular spray-time, we very seldom can count on more than between 3 and 4 days of good spraying weather at the particular time spray should be applied, which means that with one spraying outfit a man can take care of between 20 and 25 acres, so we have a unit in that respect. So, as I say, most of these orchard economists will tell you that between 20 and 25 acres is your orchard unit. Now we have then, in order to get the proper economic unit in a community management proposition, to get together enough orchards to give us approximately 20 acres of fruit. As long as we are working on smaller units, we cannot produce cheaply. Just compare the man with two acres and the man with 20 acres. Take the matter of spraying; take the man with the ordinary barrel spray, with the "armstrong" motor with which the man will spray, if he hasn't more than two acres of orchard; he will spend a full day spraying 2 acres of orchard, and spend a hard day. He will use one man to spray, one man to pump and mind the team, and one team. His total cost there, counting his time at 20 cents an hour and the team at \$2.50 a day, if it is his own team, means that he spends \$6.50 a day simply to get the spray on, besides his spraying material. His labor expense then will be \$6.50 which, on 2 acres, is \$3.25 an acre. Take the same man with 20 acres, who can afford to have a power outfit which sprays 7 acres a day; he does it with one team and 3 men, which means that by adding \$2.00 to pay for one man, he can spray 7 acres a day, making his overhead expense around \$1.15 per acre. There you have a difference of \$2.10 an acre for spraying overhead. I am not saying that those figures are exactly what you are paying for your spray-

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ing, or what some other man is paying for his spraying, but take it as an average, it is just about what the man is paying for his spray. That makes the cost of production \$2.15 less per acre for each individual spray, for the man who has the larger acreage.

I would like to call attention to other community advantages, to the buying possibilities. The man with 2 acres, cared for in the ordinary Pennsylvania style, buys only a few pounds of arsenate of lead, a few gallons of lime sulphur, a few packages, measuring them by the dozens. He pays for these the biggest retail prices. Take the matter of arsenate of lead in powdered form; if it is bought by the pound, it is 25 cents a pound; if bought by the 10 pounds, it comes down a cent; if you buy 50 pounds, it comes down another cent; if you buy 100 pounds, it comes down another cent; if you buy 300 pounds, it comes down another, so by the time you get to buying it by the 300 pounds and up, you are paying 5 cents a pound less than the man who buys in small quantities. Dr. Fletcher, who will speak to you tomorrow morning on some orchard topics, tells us that by getting a cooper to come around and make his barrels when he has a few thousand barrels to make up, he saves 9 cents a barrel. A man on small acreage cannot buy that cheaply. Orchard machinery runs up as high as 40% in profits. Not all machinery has that margin, but it goes that high. For anything the man buys in small quantities, he pays a high price, while in a community proposition, buying in large quantities, you save a considerable percentage on every item.

Then, we have marketing advantages. We have the advantage there of the big grower in being able to put enough fruit on the market to command a market over a fairly long period of time. When you develop a market, you want to keep your market. If you are going to supply them with fruit for a few weeks in the year, you cannot possibly hold your market. If you could command their attention right straight through the year, you can hold those people even though your prices be a little high. If you have a little fancy fruit, and can get them in the habit of buying from you and serve them week after week right straight through, you can command a much better paying market than if you only appear before them two or three times in the year. The wide range of varieties and the small amount of fruit in the ordinary orchard makes it impossible for the farmer to do that. You lengthen the season in local markets and cut down hauling expenses, by being able to haul larger quantities at longer intervals, instead of having half a dozen or a dozen men hauling small quantities over the same distance and consuming the same amount of time.

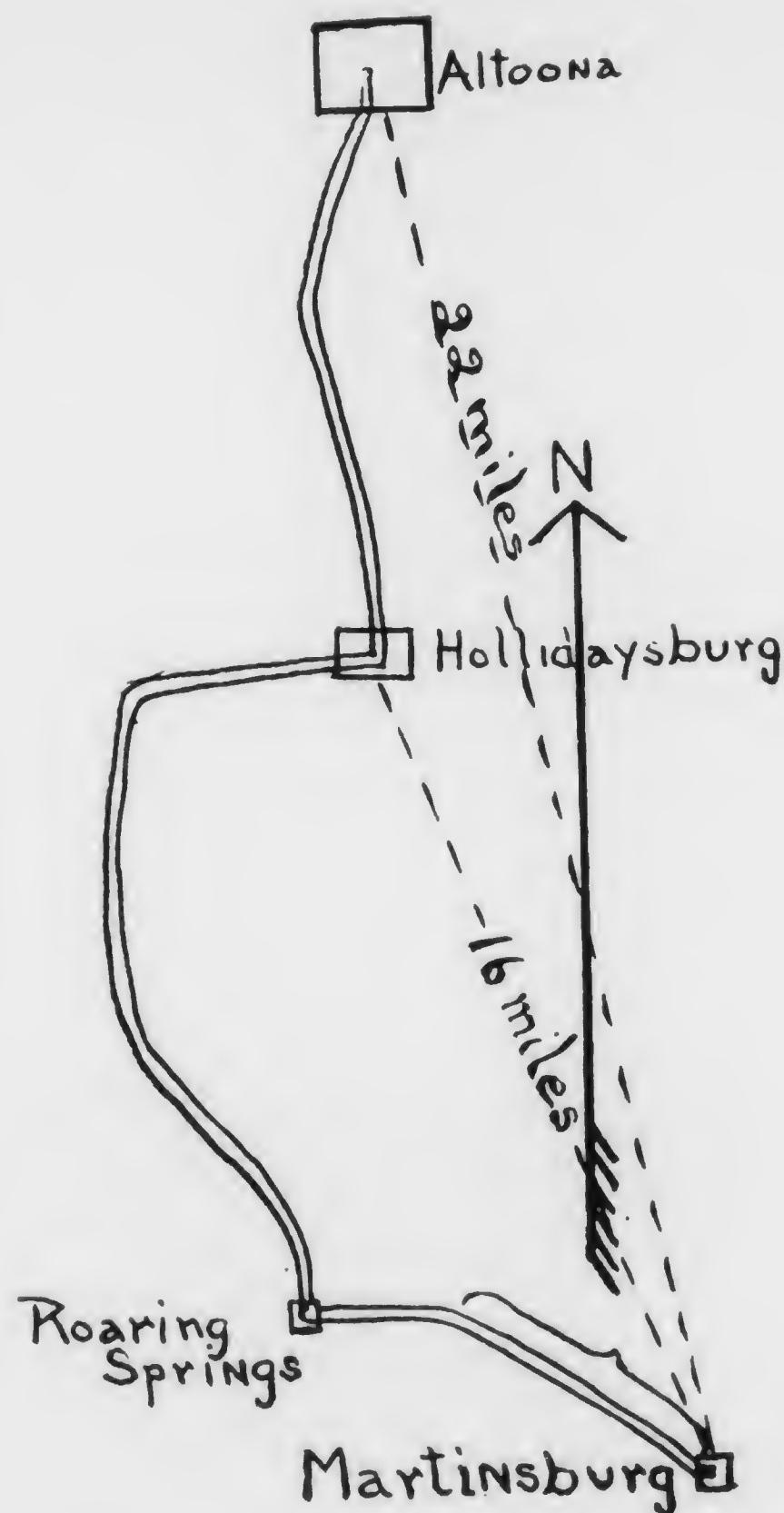
Here is one point, and it is, if you are catering to the same market, community work cuts out that price-cutting competition which you find in so many cases. Take, for example, out in New Castle we have a number of vegetable growers who are having quite a time keeping prices up so they can make a decent interest on their investment, simply because one man will go down the street selling his stuff for such a price and the next man comes down offering his

stuff at a lower price, and they get that price down and down until they don't make any money. They knew that, and they got together, and now they keep an agent in Pittsburgh—I imagine we have one of the members here now who can tell you something about this later—they now keep an agent in Pittsburgh who sells the extra stuff they cannot sell at a profit on the New Castle Market. That is not the only example; they are doing it in a great many other places in the State, and cutting out that price-cutting competition.

One feature stands out as prominent as any, and that is that in community work your standards, your grades are fixed, every grower shipping under one label, packing under one label. Every grower puts exactly the same grade of fruit on the market; there is just so much poor fruit allowed in a certain grade. His best fruit has to come up to certain standards in order to be sold as his best grade; it standardizes the grading and packing, which is one of the most important features of any kind of community work, and the feature which has made possible the great advances some of our neighbors have made in fruit growing where they are handicapped by high freight rates and high production costs and where labor is not available.

Now one more point on the advisability of the Pennsylvania farmer going into any kind of a community proposition, and that is, it frees him from orchard work when farm work demands all of his attention. He spends more time on his general farm work than on his orchard, and this frees him just at that time to take up his farm work. Take for instance, the ordinary Pennsylvania rotation; if we look at corn, corn starts in the first thing in the spring and conflicts there with the spraying. It conflicts if he puts on a late scale spray; it conflicts if he puts on a scab spray, and it certainly conflicts with his codling moth spray; if he puts on a 10-day spray, it certainly conflicts there. If he delays his 10-day spray until about a month after the codling moth spray, as a great many commercial growers do, he may avoid a conflict with his corn at that time, but it may damage his fruit; and then again, late in the season, it conflicts with his harvesting. We will follow with oats; oats conflict in the spring with his plowing and sowing all the way through, and the oat harvest conflicts with his third summer spray—the spray for the second brood of codling moths that comes along the latter part of July. Wheat will conflict in the middle of the summer with the third spray. It does not conflict as much as oats and corn. Clover conflicts the least of all; it may conflict in the haying time, but all of them conflict at some time and the farmer with the small, 2-acre orchard, cannot afford to waste a day from his general farm operations to take care of his orchard, because his general farm operations are by far the most important to him.

So, when some of the men in the Association asked that the College look up the possibilities of community management, I began looking around the State to find a place which offered any



chance for this kind of work. There seemed only two general districts where this could be carried out, one down around Altoona, in some of those orchards in Blair and Bedford Counties, and along the Susquehanna River, in Columbia, Luzerne, Lackawanna and Susquehanna Counties, where they have a great number of small orchards, none taken care of very well, the majority not at all and the farmers somewhat discouraged over the outlook for fruit growing. Especially was this true in Blair County and around that section, so we took one community down there located in the cove regions, in one of those long, narrow valleys or where two or three valleys come in together. The trees are planted down in the valley, but are comparatively free from frost. It would be called a frost pocket any place else.

Between Martinsburg and Roaring Springs we found a straight stretch of road five miles long; on the first three miles of this road were between 15 and 20 orchardists, each one having between 50 and 250 trees; 15 of them in three miles. The distance between the first orchard after we come out of Martinsburg, and the last orchard in the group was only two and one-half miles. These men were from one to five miles from Roaring Springs; they were sixteen miles from Hollidaysburg, twenty-two miles from Altoona. They have a railway in Martinsburg. They have such a quality of fruit that it will not pay them to pack it up in barrels and put it on the car in barrels. If shipped at all on a train, the only way they ship it is in bulk, shovelled on the car. To get their fruit to market then, these men haul to Hollidaysburg and Altoona, sixteen and twenty-two miles respectively, the product of from 50 to 250 trees, their average load running around 8 loose barrels, taking them 10 to 12 hours to make the round trip and costing them around 40 cents a barrel transportation for cheap stuff in cheap packages to get to a more or less cheap market, because Altoona does not take a large quantity of fancy fruit.

Ten of these men had 1,450 trees. To all fifteen of the men the College sent the following letter:

THE PENNSYLVANIA STATE COLLEGE
School of Agriculture and Experiment Station

Department of Agricultural Extension

STATE COLLEGE, PA.

Each year the farmers of Pennsylvania waste thousands of dollars through neglect of their orchards. The plea is made that their orchard is so small that they cannot afford to put in modern equipment or go to any other expense in caring for the trees.

The Pennsylvania State College is endeavoring to solve this problem, and at the suggestion of the secretary of the Pennsylvania Horticultural Society, is working up a scheme for community management of the neighborhood orchards; that is—where one trained orchardist handles all of the orchards in the community as if they were in one big block.

A number of small orchards, comprising approximately 2,000 trees would be secured. An orchardist would assume complete control of these small orchards buying a power sprayer, plows, cultivators, etc., sufficient to handle the whole group. He would prune, spray, cultivate, fertilize, pick, pack, and sell all of the fruit, giving to each farmer all of the money after expenses of operation were deducted. This would save the farmer himself having to work with his orchard when he wanted to plow or cultivate corn, or do other operations. Instead of several men taking numerous small loads of fruit into Altoona, one man would take a few large loads in. Glutting the market on certain days would be avoided and fruit would be had in sufficient quantities to make carload shipments in case there was more fruit than the local market could handle. All expenses would be divided up among the farmers on the basis of actual number of trees and the amount of time spent working with his fruit, the orchardist would be bounded to insure the growers, and the orchardist would keep a set of books open at all times to any of the men interested in the proposition.

The College is **not** undertaking this matter just at this time, but is merely investigating the possibility of this plan. As the district around Martinsburg offered unusual advantages for such a study, I am writing to you who are growers asking for as much information as possible. Answers to these questions in **no way binds or commits you** in any manner whatsoever.

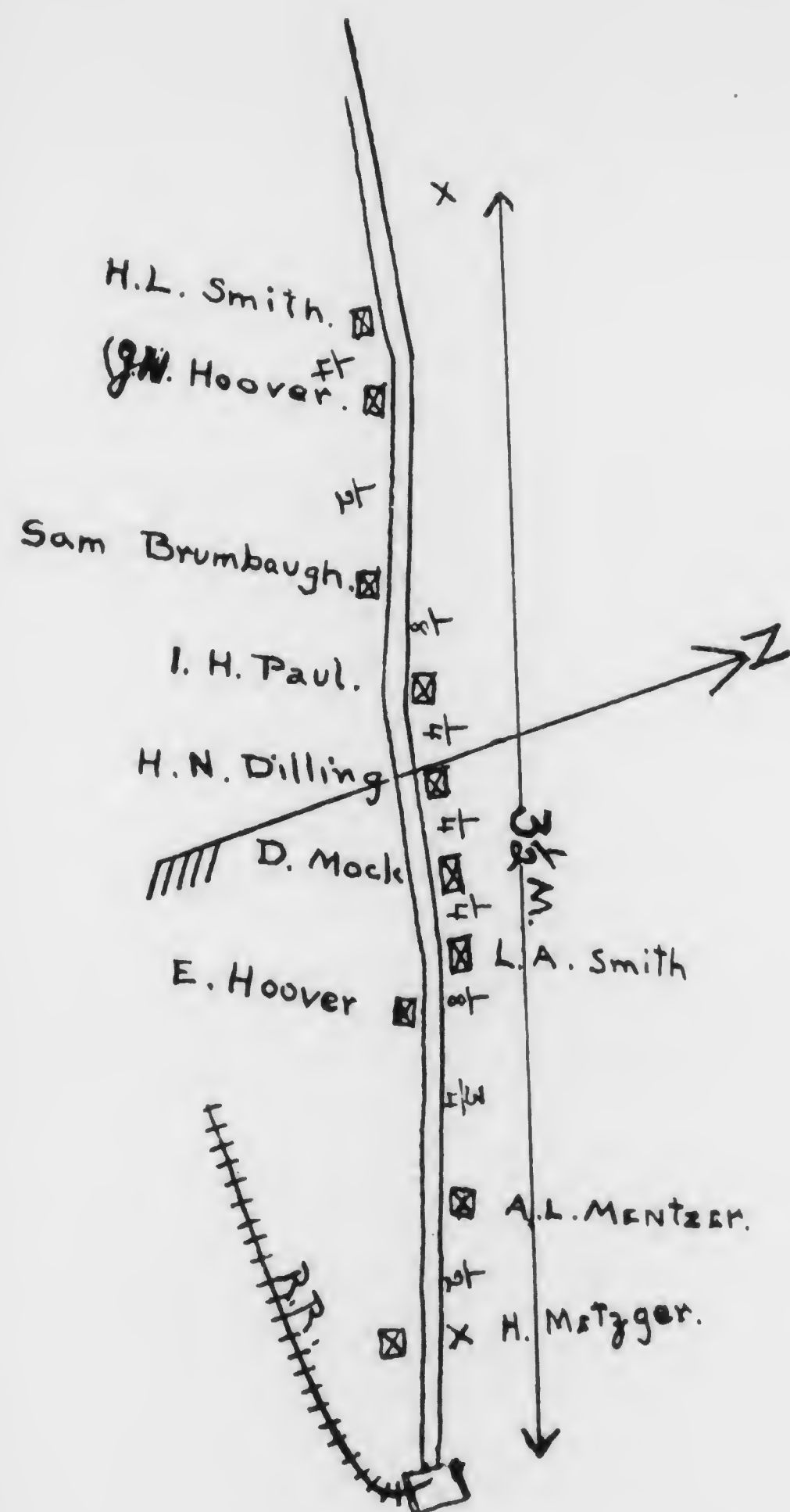
Very truly yours.

EXTENSION HORTICULTURIST.

1. Your total number of apple trees?.....
2. How old are the trees?.....years
3. How many trees of each of the following

Baldwin.....	Hubbardston.....
Northern Spy.....	Paradise Sweet.....
Jonathan.....	Stayman Winesap.....
Rome Beauty.....	Old Winesap.....
Fallawater.....	Smokehouse.....
(or Pound)	Russetts.....
Rambo.....	Belleflower.....
English Rambo.....	York Imperial.....
Ben Davis.....	Ewalt.....
Black Ben.....	Vandevere.....
(or Gano)	R. I. Greening.....
Delicious.....	Fall Pippin.....
Wagner.....	King David.....
Pumpkin Sweet.....	Maiden Blush.....
Yellow Transparent.....	Red Astrachan.....
	Unknown.....

4. Are your trees in a solid block?.....
5. Have you ever pruned?.....Sprayed?.....
6. If so, how many times do you spray each year?.....
7. What spraying equipment have you?.....
8. Have you ever cultivated your orchard?.....
9. Have you ever used manure or fertilizer?.....
10. How large was your crop this year?.....In 1915?.....
11. Where do you market your fruit?.....
12. What was your average price per bushel this year?.....1915?.....
13. How far is it to a railroad siding?.....



14. How are your roads?.....
15. Does your farm work interfere with taking care of the orchard?.....
16. Would you be interested in a proposition such as outlined in the letter?.....

Remarks.....

Signature.....

Answering the questions I asked them in the questionnaire which accompanied this letter would in no way bind them. I sent this questionnaire and letter to each of the fifteen growers and put in a self-addressed, stamped envelope, returning to the College, of course. About three weeks later, having received not a single reply, I sent them another letter. Three weeks after that, having received only four replies, I sent them another letter, and a week after that, receiving no further response, I went down myself, went around through the district and talked to the farmers and got data on seven of the fifteen orchards.

Now, gentlemen, the seven of the fifteen orchards revealed some very odd figures. In the first place, there were 33 different varieties named. Of the 1,450 trees, I saw growers representing 591 of these trees, so that the 33 varieties reported were 33 out of 591 trees, and of that number there were 244 unknown trees and these unknown trees very likely had a much wider range of varieties than showed up among these 33. Among them were:

Baldwins.....	121 trees	Hubbardston.....	18 trees
Northern Spy.....	8 trees	Paradise.....	4 trees
Jonathan.....	50 trees	Stayman Winesap.....	73 trees
Rome Beauty.....	23 trees	Smokehouse.....	13 trees
Fallwater.....	4 trees	Russetts.....	1 tree
Rambo.....	35 trees	Bellefleur.....	11 trees
English Rambo.....	6 trees	York Imperial.....	32 trees
Ben Davis.....	10 trees	Ewalt.....	12 trees
Gano.....	6 trees	R. I. Greening.....	6 trees
Delicious.....	11 trees	Fall Pippin.....	17 trees
Wagener.....	17 trees	King David.....	4 trees
Pumpkin Sweet.....	12 trees	Maiden Blush.....	21 trees
Yellow Transparent..	8 trees	Red Astrachan.....	9 trees
Early Harvest.....	10 trees	King.....	10 trees
Grimes Golden.....	10 trees	Wealthy.....	4 trees
Pewaukee.....	5 trees	Black Twig.....	20 trees
Unknown.....	244 trees		

The trees proved to be all in solid blocks. I saw blocks ranging from 50 to 250 trees, in every case in a rectangle. Part of the men had pruned—four of them slightly; two of them not at all. Two of them did not spray at all; three of them sprayed once, and one

sprayed once and occasionally oftener. The only spraying equipment was the barrel sprayer which, of course, was the only equipment that would pay on a small orchard. Occasionally they cultivated—when they did, they cultivated in order to put in a grain crop. Occasionally they used manure and fertilizer; manure every fourth year had been the treatment of three of the men. The crop on 591 of these trees was 4,100 bushels in 1915 and 1,650 bushels last year. They ranged from three-quarters of a mile to three and one-half miles from the railroad siding. Their road was a level road, straight road. The farm work interfered in every case, except one, with the general orchard operations. I don't know how it was that that odd man happened to handle his orchards without any interference, unless he was the one who did not spray, prune or touch his orchard. One man said that he was absolutely not interested in any kind of a proposition like this, and the other five were skeptical as to its possibilities, and the conclusion as to the availability of that community for this kind of a proposition—you see the conclusion is distinctly negative, because, if the growers themselves are not looking for a proposition of this kind, then a co-operative effort in that community certainly will not work.

So there we are with the 10 growers and 1,450 trees. What will it cost to stage a community proposition down there? Now, in the first place, we would have to get a salaried man and put him in charge—a trained horticulturist or man of practical experience. We could not get such a man without paying \$75.00 or more a month, because we would have to get a man that had some organizing ability; so, say we pay a man \$1,000 a year; that is \$82.50 a month, which we would have to pay in order to get a man who would be strong enough to hold that kind of a bunch together. For equipment we would have to have a team, spray rig, disc harrow, plows, tools, wagons and other equipment to the extent of approximately \$925.00, and a packing equipment, including a shed, at a cost of \$200.00 making \$1,125 at least for equipment that he would have to have. Then his running expenses for the year, taking it for granted he took 20 acres down there, just the amount these ten men had, would include \$250 worth of spray for the 20 acres, \$250 for team keep, \$180 for fertilizer and \$100 for covercrops, making altogether \$780 for his running expenses for a year, or a total of \$2,905, which is \$145 per acre. You can see when you talk \$145 per acre to any general farmer, no matter how interested he is in his orchard it is going to be pretty hard to convince him that you can pay out on a proposition of that sort, so it would have to be only the most enthusiastic farmers that you could get into a proposition of this sort.

Now that \$2,905 is \$145 per acre for equipment; or, counting 30 trees to the acre, because they are planted about 30 by 30, it is \$4.75 a tree investment that that man would have to make in order to carry this proposition through to harvest time the first year. \$1,125 of this is taken up in equipment expense which would not have to be duplicated the second year. Now the question that any



Eli Hoover's Orchard



There are some young trees in the valley.

financier would ask would be "Why are you charging that off the first year?" Simply because, gentlemen, in an organization of this sort, it would have to be charged up the first year because no one would dare run the risk of carrying this expense on for a long while. It would be hard to get a man to be willing to let this thing be strung out. If your orchardists went into this thing for one year with the expectation of going in for several years afterward, they might as well pay it all the first year, because then they won't have to pay it the following years. If, however, they go in the first year with the idea that if it does not work out as well as they want, they will quit, then they must certainly pay for it the first year, or they won't pay for it at all. That is why we charge that equipment up the first year. The second year they only pay \$1,780, or \$88 an acre, \$2.90 a tree for the succeeding years.

Now, to pay out on this, counting \$2.90 a tree to bring the crop up to the harvest time, it means that we have to add 60 cents a barrel to our costs because it costs about that much to pick and pack a barrel; then we would have to get three barrels of apples per tree and sell those for \$2.20 a barrel in the orchard, packed out, in order to make out the first year and pay this total amount. Subtracting \$1,125 equipment expense the second year, 2 barrels sold at \$2.05 in the orchard would pay out, so anything above the 2 barrels per tree except 60 cents a barrel for packing expenses, would be net gain. These old trees are all large, the 25 or 50 year old kind in almost every case, solid trunks, solid in all branches, merely old, neglected trees. A production of 4 barrels per tree would not be at all unusual if they were fertilized and cared for properly. I think any grower here with old trees, who is taking care of them, would say that 4 barrels a tree would not be an unusual production if taken care of as outlined in the previous part of this paper. In that case, if my figures are at all correct—and I think I have allowed sufficient leeway in every case to make the figures fairly reliable—if he would average 4 barrels per tree, he would have a net profit of \$2.75 per tree, selling his fruit at \$2.00 a barrel in the orchard, or \$82.50 per acre.

To sum up; taking into consideration the size of the orchards down there, the size of the trees, the cost of equipping the community proposition, after the first year the men would have to get 2 barrels of fruit per tree to pay out. On these old trees, on which a production of 4 barrels per tree would not be excessive, they would make, if they sold their fruit for \$2.00 a barrel in the orchard, \$2.75 per tree, which, counting 30 trees to the acre, would be \$82.50 per acre.

After we arrive at this figure I want to say that it is an estimate, because this kind of a proposition has not been carried out yet, and only when it is carried on will we be able to tell exactly what it is going to cost to run the thing, but after allowing liberally, I think that these figures are approximately correct. But, as I say, only when we do it can we tell. To conclude, community proposi-

tions will only work in Pennsylvania where we have a large number of small orchards close together, where the man will have to go not more than half a mile to get from one orchard to another; only where the growers are getting such prices per bushel for their fruit that they are discouraged and feel that they cannot make money by themselves and want a proposition; only where they are so far from the market that they cannot handle their own marketing problems successfully. When we do find such a community—and we have a number of such communities, but not the men—we can make it successful. Now I have 15 pictures I want to throw on the screen here, which will give just a rough view of the community and the work down there. There was one point I neglected to mention that was very important. I mentioned that their production this year was 4,100 barrels from the 1,450 trees, and last year it was 1,650 barrels; for this crop in Altoona, they got from 28 cents to 60 cents per bushel; the lowest average of any of the growers was 28 cents; the highest was 60 cents per bushel. It cost them 40 cents a barrel to get it there; that is about 14 cents a bushel, aside from their other costs. Here we have one of the orchards down there in that section in leaf; he is the only man that had a picture of his orchard in leaf. You can see the size of the trees; there is nothing special the matter with the trees except that they needed a little care; the orchard was used as a cow pasture or anything that came handy.

A Member: How tall are the trees?

Mr. Mason: Those are about 30 feet. The average specimen of apple that goes in from that section has sooty fungus, scab, some scale—pretty near anything on the apple. Here we have that section. Here is Altoona, here is Hollidaysburg, Roaring Springs, and then in this section from Roaring Springs over to Martinsburg is known as the Morrison Cove district, and it is from this turn right here down to Martinsburg where that row of orchards of which I was speaking is located. This next map shows in detail the line of orchards, and here you will see the names of the owners. You will notice that the distance between these two is a quarter of a mile; here we have $\frac{1}{2}$, here $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{3}{4}$, and $\frac{1}{2}$. Now in along here are other orchardists. There are two on this side who have only about 30 or 35 trees. There are 10 or 12 of those men whom we did not interview at all, because we were taking only those who had 50 trees and above. The total distance from the railroad siding up to H. L. Smith's four year old Stayman Winesap orchard is $3\frac{1}{2}$ miles; from Mr. Metzger's here up to Mr. Smith's is a little less than 3 miles. This shows the general view of that country. You will get the idea that they are down in the bottom of a hollow. You are pretty near right in drawing that conclusion. However, this Morrison's Cove has good drainage down the valley and good drainage up the valley, and somehow or other they escape frost year after year, always have a crop of very high colored fruit. They are on a moderately light soil—quite a little rock in it. I do not know the soil series; half a dozen series of soil run through that part of Blair County; I do not know whether Mr. Dunlap can help



Typical Tree.

us with the soil type there or not. That was an ordinary orchard in that section. Here is one picture looking down this road which runs straight along here for three miles; it does not come out very plain; it shows the grouping there and a small orchard there and another down there. That is Hoover's orchard and there is another orchard over there. You see there is row after row of them on both sides down that road. Here we have one of Mr. Metzger's; he was the first man on that list. You can see the general style of the trees there; there are about 50 trees in that group, which runs on over here, about 5 rows further to the right, and occasionally a tree out—in a square block, easy to take care of as far as cultivation is concerned, although, being isolated from other orchards, you would lose time going from one to the other. Next we have Mr. Metzger's orchard, which is shown in this picture, and typifies the general orchard conditions down there as well as any picture we have. Up here to the right we have a young orchard of Mr. Metzger's, which is shown in the next picture. He has 60 trees in his old orchard. Here is his young orchard, just coming on; he has about 200 trees in his young orchard. This is an individual tree in Mr. Metzger's orchard and it is perfectly typical of the bulk of the 1,450 trees of which I spoke. You can see they are headed out there at about 6 feet; they have the lowest fruit bearing branches at just about 7 or 8 feet, and the ends droop down about 4 feet. You could drive a load of hay under some of the trees, but most of them are just moderately high-headed trees. We would have to take some of these upper branches out, and it would mean slow renovation for the first two or three years and quite a little rough pruning on these trees the first two years. On the other hand, it would reduce the fruit bearing surface on those trees a tremendous lot to prune them the first year properly.

A Member: Would you cultivate the orchards?

Mr. Mason: That would be a problem that would have to be worked out. Some of these orchards we would not be able to cultivate, they would have roots so near the surface that you could not do it. On the other hand, most of these orchards have been put down in grain every fourth or fifth year so that you would not run much risk if they had plowed for grain that frequently. This is Mr. Hoover's orchard; he has about 100 old trees and 60 of the 100 are Baldwins. All those are solid in the trunk. None of those are the hollow trees you ordinarily find when you see an old orchard like that. Most of them are very solid, very vigorous, but just uncared for. This is looking down at Mr. I. H. Paul's orchard. The valley drops into the hollow down here 200 feet below Paul's orchard. It is half a mile from his orchard over to the mountain and it drops down 200 feet in that distance. Mr. Paul has about 225 trees on his place, of which about 100 are old trees of that kind. This is Dave Mock's orchard. Dave Mock has not made any attempt to take care of his orchard and admits it. He has his fence rows, the woodpile, and everything else in there. A large number of the trees would not do very well for Mr. Mock until they had been cared for for two or three years. On the other

hand, I walked through this orchard and there are only one or two trees in the orchard that had any kind of hollows in the trunks or had any big limbs that were dead. All those old limbs are alive. It means that the orchards are vigorous but uncared for. I do not recall whose orchard that is there; it shows how they lay, one after the other, in small, square blocks of 100 trees each.

Well, gentlemen, you can draw your own conclusions. You have heard mine. I was asked to discuss the community possibilities and I have done my best on it and have shown you a few typical pictures of some of the communities we have in Pennsylvania. If there are any questions, or anyone has any remarks, I certainly would like to hear them.

A Member: How high trees of that type do you feel that you could spray successfully?

Mr. Mason: Well, the trees up around 30 feet could be brought down quite a little bit without seriously injuring the wood. Most of these trees have enough room so they have plenty of branches down lower. You could not spray a 30 foot tree without a power sprayer, about 25 feet. A great many of **them** have the biennial bearing habit very well established.

A Member: That would be something to consider in your figures.

Mr. Mason: Yes, it would be something to figure on, but by the application of fertilizers you would increase the regularity of the yield.

A Member: Would not the old trees be just starved out?

Mr. Mason: That is the trouble with a great many of them at the present time, they are just starved out for want of attention; they have borne apples in spite of the grower, rather than because of him.

The meeting then adjourned.

Wednesday, January 24, 1917—9:00 A.M.

THE GREATEST MENACE TO AMERICAN AGRICULTURE AND HORTICULTURE

By J. G. SANDERS, Economic Zoologist, Harrisburg, Pa.

I desire to call to the attention of this audience one of the most serious conditions endangering agricultural and horticultural interests in our country—a condition to which we are slowly but surely awakening, and I believe the time is close at hand when almost unanimous action will be taken to eliminate these dangers.

I would presume that the majority of my auditors are so well informed regarding the pernicious practices which now obtain in the United States, whereby an open-door is maintained for the

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introduction of immense quantities of infested and infected plant material, that argument for the limitation of this evil would be unnecessary. But I have eminent reasons to believe that not all of our co-workers in the promotion and maintenance of agricultural and horticultural health have fully sensed the present pitiful condition of these interests in our country, nor do I think all of us realize the many dangers which threaten our welfare with every shipload of foreign plants discharged on our shores.

If every teacher and student of the practical sciences, and every member of our many agricultural experiment stations was fully cognizant of the history of plant pest introduction into America, and of the untold millions lost annually through their ravages, it would seem that sufficient publicity could be given the facts, to awaken careless America to remedial action. I have used the expression "careless America" advisedly yet truthfully. We Americans are subjects of derision by foreign nations, on account of carelessness in many phases of our national and economic life. Our coasts are inadequately guarded from human invasion, aided by powerful machines of war, and there is but little doubt that charts and plans of many of our coast defenses, and full reports of our vulnerable seacoast are reposing in the vaults of foreign nations.

These foregoing statements are preliminary to a recital of needed forms of defense against enemies of plants, which are threatening the food product possibilities of our country, just as surely as similar enemies in the past have entered and attacked our agriculture and horticulture, destroying each year several times the total annual appropriations for our army and navy. As the speed of ocean travel lessens the transportation period and increases the frequency and facility of shipments from abroad, we cannot expect a diminution of the danger of plant pest introduction in the future. Our judgment from past experiences warns us of even greater evils to come.

Unwise persons have asserted that soon we will have imported all the pests which threaten us, and this danger will have passed. Impossible! No one cognizant of the multitudes of dangerous insects and plant diseases throughout the world, as yet unreported in this country, would accept such an hypothesis. Just as a wise physician can diagnose a dangerous disease in its incipient stage, or can foresee an epidemic, if quarantine regulations were abandoned or unenforced, so can a plant physician and entomologist foresee calamity to agriculture in its various branches, when precautions are ignored, and dangerous pests permitted entry and establishment.

Unknown dangers lurk in every shipment of plants to America from foreign lands. Even though it might be humanly possible to inspect them for known foreign pests, certain insects and diseases which may be insignificant in their original native surroundings,

when introduced into new territory without their natural enemies and checks, and, perchance, finding new and more pleasing host plants will multiply with startling rapidity, and soon become destructive pests. The chestnut blight, white pine blister disease, the citrus canker, cotton boll weevil and San Jose scale are notable examples of development under these circumstances. Every plant-feeding insect has the inherent valency of a destructive pest. Nature conserves the balance, which too frequently is disturbed by commerce and agricultural practices of civilized men.

The pristine condition of America from an agricultural standpoint was ideal for the production of amazing crops at low cost, on account of the paucity of destructive insects and plant diseases. Could our plants and seeds have been introduced without the attendant diseases and insects, we might today have been growing potatoes free from scab, early blight, late blight and rot, powdery scab and scurf, and there would have been no necessity for the autumn reduction of the midsummer estimates of the potato crop by our Federal Agricultural Department by millions of bushels, occasioned by uncontrolled ravages of the late blight and rot in 1916. The potato, like certain other of our agricultural products, was introduced from abroad, and in the absence of the introduced pests and diseases our crops would be fully returned.

Since the organization of the Federal Horticultural Board, and the subsequent inspection of imported plant material, 508 distinct species of insects, and 189 distinct plant diseases have been intercepted on plant imports from abroad. It is safe to presume that a considerable number of these would have developed to the stage of serious and destructive pests, if we may judge from performances of similar introductions in the past. By no means, however, has our inspection been able to prevent the introduction and establishment of numerous insects and diseases, some of which may even now be established and are rapidly multiplying, but as yet have not attracted the attention of the scientists.

A list of the introduced insect pests and plant diseases, which have become established in this country, would be too extensive and lengthy for consideration at this time, but I will enumerate a number of the more important ones, and I am sure that you will recognize a large number of those pests which we consider of prime importance in America. It is my rather hasty determination that approximately 75 per cent. of the major insect pests and plant diseases of the United States have been introduced from abroad. Surely some of the most destructive ones are in this category. Among the many plant diseases which have probably been introduced, and are now demanding serious consideration, are the asparagus rust, alfalfa leaf spot, black rot of cabbage, bean anthracnose and rust, European apple canker, apple scab, pear scab, brown rot of various fruits, the downy mildew and white rust or *Cystopus* of cruciferous plants, the chrysanthemum rust, chestnut blight, certain diseases of cotton, carnation rust, grape vine rot, the hyacinth disease, the hollyhock rust, the loose smut of oats, the

olive knot disease, practically all of our various potato diseases, the tomato leaf spot, the peach leaf curl and peach scab, ergot affecting rye and allied cereals, a damping-off disease common to greenhouse and bedding plants, violet rust and loose smut and rust of wheat and other grains; Also, those recently-introduced diseases, the white pine blister canker, the citrus canker, the poplar disease, and glume rust (*Puccinia glumarum*) destructive to wheat, barley, oats and many wild grasses.

In this list, those of you familiar with plant diseases have noted a large number of our serious plant pests; those more familiar with the insect pests will recognize, in the few which I have listed, some of the most serious creatures ever introduced into this country—the San Jose scale, the fluted scale of citrus, the oyster-shell scale, black scale, red scale of California, red scale of Florida, European fruit scale, European fruit lecanium, cottony maple scale and the tulip treescale, as well as many other scale insects which are pests in greenhouses throughout the country, the codling moth, Hessian fly, anguino grain moth, the hop plant louse, cabbage worm, several species of weevils affecting peas and beans, three species of domesticated cockroaches, bulb mites, narcissus bulb fly, the elm leaf beetle, gipsy moth, brown tail moth, leopard moth, cotton boll weevil, the alfalfa weevil and Argentine ant. In this list we find some of our most expensive and costly importations; but by no means have we introduced all which may come to our shores—for there awaits introduction large numbers of species of insects and diseases, which are known to be pests in foreign countries, and might possibly be much more serious if introduced to America.

The question which arises in our minds is a preventive for this amazing and startling condition of affairs, and there seems to be but one method whereby we may eliminate further danger absolutely, and that is by a federal embargo on the further importation of plants and plant products from abroad. The imposition at once of such an embargo would for a time handicap the nurserymen, florists and seedsmen of this country, but there is no reason to believe that a final adjustment of these lines cannot be effected within a very short time, so that we will not be dependent on other countries for our horticultural products.

Statements have been made by our nurserymen that it is impossible to grow in America plants of such superior quality, as are now produced abroad and shipped to this country. This is a debatable question, and will remain so until absolutely serious efforts have been made in America to produce these desired products. The placing of an embargo on the import of horticultural products would ultimately benefit the nurserymen, florists and horticulturists of this country, by eliminating those pests which are gradually being introduced into this country, and just as surely after due time and opportunity, are injuring all demand for certain kinds of nursery and florists' stock. As for instance, no one in the region now infected with chestnut blight will buy or plant chestnut

nursery stock. If the citrus canker should escape control in Florida and ruin the citrus industry, the nurserymen growing citrus stock would have to seek other business. If the white pine blister canker escapes and destroys our white pine as rapidly as it is planted, there will be no demand for nursery stock of this type. Similar examples might be cited in other lines, if so desired.

The possibility of a federal embargo being placed on the importation of nursery stock has aroused some of our nurserymen and florists considerably, and they have maintained that an "absolute embargo" would almost ruin their business. Certain of the far-seeing, and I may say better informed nurserymen, realize that something must be done to protect their interests from the ravages of pests, and after two or three informal talks with various groups of nurserymen, I am pleased to report that in most cases these men are willing to forego the importation of certain classes of what may be termed "finished nursery products," feeling that they wish to continue the importation of seedling stock for propagation in this country. In one informal conference with some nurserymen, in which this problem was discussed, there was evidenced the feeling that nurserymen generally would be fairly well satisfied if all "finished nursery stock," including all plants with balls of earth about their roots, were prohibited, and permission given to import (1) fruit tree seedlings; (2) 2-year seedlings, cuttings, buds or grafts of ornamental shrubs; (3) deciduous shade, ornamental and forest trees not to exceed six feet; (4) coniferous evergreen stock not to exceed eighteen inches, except 5-leafed pines which are prohibited. If a proposition of this sort was maintained, and an embargo arranged accordingly, I fully believe that 75 per cent. of the present amount of inspection would be eliminated, and, furthermore, this arrangement would eliminate the importation of some plant importations, most dangerous on account of the impossibility of inspecting them thoroughly.

After giving this problem much thought and consideration I feel that I could recommend, without too much injury to the importing nurserymen, an embargo on all importations of plants with earth about the roots, to be enacted as soon as possible, and that a three-year period be allowed for the importation of the classes of nursery stock outlined above, after which all further importations should be prohibited, except importations by the United States Department of Agriculture of such nursery stock as is deemed desirable by said department—this to be grown and propagated under quarantine for a reasonable period before distribution. This proposition doubtless, even though quite lenient, will be opposed strongly by many importers, but the question to be considered is whether we shall continue to permit the importation of a few thousand dollars worth of plants, any shipment of which may bring in a dangerous pest, which ultimately may cost the country millions every year. Is it not appalling, in consideration of the long list of imported plants now established in this country, when we learn that \$14,293,500,000 has been spent in

New England by Massachusetts and other infested states, with the Federal Government assisting, to prevent the spread of the gipsy moth? These figures do not take into account the immense damage to forests, woodlands, private and public premises, nor the amounts of money spent privately for control of this pest. It would be absurd to attempt an approximate estimate of the total cost and losses entailed in this country by the introduction of the San Jose scale about 1870. The futility of attempts on a large scale to control an insect pest or a disease, which has once gained a firm foothold in this country, is apparent, for in no case have any such attempts succeeded in this country, nor will they ever succeed under the present system of government, unless very broad, comprehensive power is given to some official board. Our experiences of the past show that the actions taken for control are usually several years behind the advance of the pest.

The establishment of an embargo on "finished plant products" would place in the hands of our legitimate nurserymen and growers the very business in which they are concerned, and would eliminate the present baneful system whereby nursery stock of doubtful origin, variety and quality is sold by brokers, dealers and commission houses everywhere. Much of this stock is shipped to this country to be sold on consignment or at auction, and it is oftentimes of such poor quality that it should have been placed on the brush pile in foreign countries. The nurserymen of this country have done little to protect themselves against this practice, but as a matter of fact the step has been taken for them by an agreement recently signed by all but five of the growers and exporters in Holland, binding them to prevent further shipment of nursery stock for sale at auction in this country. According to latest reports only five Holland exporters refused to sign this agreement.

Adam Smith in his valuable treatise "The Wealth of Nations," says "By restraining, either by high duties, or by absolute prohibitions, the importation of such goods from foreign countries as can be produced at home, the monopoly of the home market is more or less secured to the domestic industry employed in producing them."

Destruction of the nursery and florists business would not follow the adoption of a limited embargo as outlined above, to be succeeded after a short period by an absolute embargo.

Years ago Germany, France, Austria-Hungary, Holland, Switzerland and Turkey prohibited absolutely all entries of nursery stock from the United States. These countries took this step after one severe lesson, viz., the introduction of the grape phylloxera from America which ruined their vineyards, but we have had numerous severe lessons in the United States, but no adequate measures for protection have been adopted and enforced. Had the United States Government taken similar action, even at that time, this country would now be free from the brown-tail moth, leopard moth, citrus canker, chestnut blight, white pine blister

canker, alfalfa weevil and many lesser pests introduced since that time.

Only this year we are informed that an extremely dangerous borer of the twigs of peach, apricot, cherry and plum trees has been introduced into the District of Columbia, presumably from Japan, and having multiplied enormously, has spread for miles around, injuring about 90 per cent. of these trees in its path. At this time it promises to be one of the most serious fruit pests ever introduced into this country.

Mr. President and gentlemen, under the present conditions of inadequate and nearly futile inspection, the importation of pests will be a continuous performance. It is beyond human ability of the most expert kind to inspect plant imports with absolute certainty, and past experience has shown the weakness and failure of our present system. More stringent methods must be adopted. I firmly believe that there reposes in the educated men of this country, a sacred trust that they shall pass on to the next generation the optimum conditions for the promotion of agriculture, horticulture, forestry and public health.

ADVERTISING

T. D. HARMAN, Agricultural Publishing Association,
Chicago, Ill.

Webster tells us that advertising means "To give notice," "To inform or apprise," "To announce publicly."

Accepting these definitions as correct, it is easy to see how advertising can benefit any honest vocation, business or endeavor. It is also easily seen that dishonest business cannot stand the light of announcements. Reasoning from these facts we must conclude that publicity is today the greatest force in the world in making men genuinely honest. If this be true, and it is, advertising is a fit subject to be discussed in the conferences of all organizations, such as this, and it should not be excluded in the councils of civic and church bodies.

God loves the man that gets there and stays. It takes honesty, integrity and faith to succeed in any line of business. Dishonesty is always a step backward. It may enable a man to go forward for a while, but it will not last, it cannot last. I am a firm believer in the idea that we all get paid in this world for every good thing we do, and have to settle for every mean thing we do. I have experimented on both sides many times and have never failed to "reap just what I sowed," ten, twenty or a hundred fold or more. As to future punishment, I leave that to Theologians, who know no more about it than anyone else, but think they do. If we still have to settle in some future world for the mean things we do, and I am

not disputing it, what a power for preventing punishments now and in eternity is advertising or publicity, or whatever you may choose to call it.

Last week the world paid tribute to a boy who was born and raised on a bleak New England farm. Every flag of our great nation hung at half mast and every function of our government was stopped during his funeral obsequies. His one time foes revered his name and joined in paying him homage. Admiral George Dewey had surrendered to the last great conquerer, death. While every action of this great man would stand the light of the most searching publicity, the climax came at Manila Bay. Nerved by his duty, he fearlessly conducted his fleet through the mines and dangers at the entrance of this supposedly impregnable stronghold of the enemy. Quietly and orderly he arranged his great fighting squadron in line of battle. When all was ready he modestly said: "When you are ready, Mr. Gridley, you may fire." He had not finished the sentence when every gun in that great fleet belched forth their answer in fire and flame. The battle was won. Manila fell. Dewey's first act was to cut all the cables, and for many long days this country knew not what had happened. At last the news of his heroic work reached his own country. His name was on every tongue. Every man, woman and child of this great nation paid him homage. He was "our hero."

Was this sublime incident in this great man's life an accident? No! From childhood he had been preparing for this climax. Probably as a bare-foot boy on that stony farm in Vermont he had done his work a little better than the other boys. In the interim between the civil war, in which he had played no insignificant part, and the Spanish war, every moment of Dewey's time was spent in getting ready for Manila Bay. It is the greatest argument that can be offered for preparedness. His life and actions are the greatest lessons that can be held up to our young men, whether engaged in civil or military pursuits.

But, you ask, what has advertising or publicity to do in this case. Everything. Though modest and retiring in himself, Dewey had done something that the world appreciated. If left to his own inclinations, his answer would have been as brief as Commodore Perry's when he won such a decisive battle on Lake Erie; "We have met the enemy and they are ours." This country realized what he had done for it and the world recognized a great man. All publications from the smallest to the greatest gave him publicity that money could not buy. He had earned it. He did not seek it. He got it because it was due him. It was the reward of an accumulation of good work well done and he received his reward.

There are many Deweys in all business pursuits. Men patiently working out ideas and principles that will benefit their fellow man; men marking time until they are sure they are right, then telling their associates they may "fire."

What does the world owe to the originators of your best varieties of fruits? A list longer than can be produced here could be enrolled

as benefactors of mankind. More honor and glory are due the men who discovered and developed the Grime's Golden, the Stayman, the York Imperial and other varieties of apples; the Concord and Delaware grape and numberless varieties of small fruits, than is due the heroes who win battles. Their memories will live on through the publicity which they have so well earned, and monuments should mark their last resting places, advertising the fact that the world is willing to pay tribute to all men whose good work has made the world better.

Selfishness is the bane of all human efforts. Will it pay? Is there any money in it for me?—are generally the first questions that come up when any enterprise is undertaken. These questions are probably right and proper, but back of all and underneath all a more altruistic idea should prevail. God doesn't care for money. Just look at the kind of people he gives it to. If they are not already debased he knows they will be soon. He knows that the man who has more money than he needs will become dissolute and snobbish, or be a tight-wad and miser, which is worse. The sooner we observe the spirit of the Golden Rule, the better it will be for us all. Helpfulness is preached to death but seldom practiced. If you know what has helped you and feel sure it will help your neighbor, advertise it. Tell it. Demonstrate it by your actions and work, and like **bread upon the waters**, it will come back to bless you.

Publicity, which is only another name for advertising, is the searchlight focused on the products which you have to sell. The fine fruit at the top of the barrel, crate or basket tends to disgust the person whom you cheated the more when he discovers the undesirable fruit in the middle of the container. You are cheating yourself every time you deceive your customer and injuring everyone engaged in the same line of business. You may get away with it for a few times, but it will come back to haunt and hurt you all the rest of your life. An old adage says: "We are advertised by our loving friends." It is nearer the truth to say: "We are advertised by satisfied customers."

If vigilance is the price of liberty it is also the price of success. **Self-satisfied** is the ruination of many men. Keep at it. Shakespeare tells us to "Keep the soul alive with honest discontent." Solomon had this idea in mind when he wrote: "Doth the wild ass bray when he hath grass"? Solomon knew that even the wild asses would make no fuss about anything when they had all they needed to keep them alive. Ever since this wisest of all men wrote this, there have been asses who have been selfish enough to think only of their own requirements, and when these were satisfied had no concern about their neighbor.

Like all kinds of business, fruit growing has its fat and lean years. You should not be discouraged when the lean years come. They mean time for preparation; time for courage and determination. More time to outline your life's work than when you are harvesting your crops and hoarding your treasure. A good time

to advertise to your neighbors and the world that you have faith in your chosen avocation and that "Faith without work is dead."

It is to be presumed that the managers of your organization would not have given the time on this programme for the discussion of advertising without expecting to get some information on the matter of **Profitable Publicity**. In other words, would it pay to spend your money in letting consumers know the superior merit of your products? This question can be answered both Yes and No. **Yes**, if done efficiently and sufficiently. To do it efficiently it must be truthful. If your fruits are good enough to stand the searching lime-light of publicity—**Go to it**. If they are not, the more you say the worse it will be. It has been a hazardous thing to make the statement that Pennsylvania produces better apples than are grown in the great North West.

Advertising has established in the minds of most consumers the idea that western fruits are superior to any other. To overcome this will require a heroic effort. It can be done by publicity only. As to do it sufficiently, it means that the work must be done well, regardless of cost and work, or it had better not be done at all.

While Florida oranges may be sweeter and more palatable, most people eat the "Sunkist" oranges of California with a conscious feeling that they are the best oranges that grow. All this has been brought about by the powerful influence of well written, well directed advertising.

Wednesday, January 24, 1917—2:00 P.M.

ORCHARD DISEASES—Illustrated
J. F. ADAMS, State College, Pa.

In the discussion of the subject assigned, the speaker wishes to emphasize a few of the more important fungus diseases affecting the peach and apple. The grower cannot hope to combat successfully, the diseases with which he is concerned, without a thorough knowledge of their nature.

It is essential that the symptoms of disease be recognized, as often much loss is experienced by the grower not knowing his trees are affected. The symptoms of disease vary with the fungus, so it is usually possible to associate the cause of the disease, providing one is in a position to accurately interpret symptoms. This is acquired only by continuous observation of the growing plants.

The life history of the parasite is next in importance, as successful control and treatment depend upon this knowledge. If we know the means by which the fungus winters over, it is suggestive of one means of control, as is well illustrated in the following diseases; Fire-blight, Apple Scab, Black Rot Canker, and Brown Rot of Peach. While spraying is one of the big factors in treatment for fungus diseases, it must be kept in mind that any means for the

destruction of that part of the host in which the fungus hibernates during the winter, will materially assist in making the spraying more effective.

Before taking up the details of the more important fruit tree diseases, a few general remarks may possibly prove suggestive at this time as to the methods by which we may hope to meet these diseases.

There is a great difference in the susceptibility of trees to disease. This is well illustrated by the "Smith Cider" variety of apple which is very susceptible to "Apple Blotch," and to such an extent that other varieties of fruit are infected from the fungus living on the twigs and fruit-spurs of the Smith Cider. Resistant varieties are not necessarily immune, as this quality fails to hold for all regions, or under certain conditions of soil and climate. The grower is concerned with the selection of resistant varieties for his own particular vicinity. By close observation, the grower can eliminate the undesirable varieties which are especially susceptible to the diseases prevalent in the region concerned.

There are many diseases of plants that are not caused by parasitic organisms. Unfavorable soil and atmospheric conditions, like an excess of moisture or too high a temperature, will produce disease symptoms. Many diseases from these causes are beyond our control. However, there are conditions favoring the development of certain of the diseases with which we are concerned that may be checked or at least lessened by careful attention to the factors of prevention. Fire-blight is more prevalent with trees producing rapid growth. Apple-blotch on the fruit is more serious when the cankers are neglected. Storage rots of apples are more destructive in a warm, moist atmosphere. It may be said that fungous diseases will always be more common with weakly or ill-nourished trees. Many other instances could be cited where unfortunate situations may be avoided by controlling the factors favorable to the progress of various parasites.

Many diseases have become established, in regions originally free from diseases, by the agency of infected nursery stock. The "crown gall" of fruit trees has been conspicuous in this respect. There is still need for more careful inspection of nursery stock between states as well as sections within states. It is well, in purchasing nursery stock, to secure it from sections which are known to be free from infectious diseases.

As we are concerned with many diseases which are established in the orchard, the problem of prevention of spread and infection of disease is of importance. This problem is well illustrated in the proper sterilization of tools used in cutting out Fire-blight. Black Rot, Apple Blotch and Bitter Rot cankers well illustrate the places where these diseases hibernate. These cankers renew their growth each spring, not only impairing the growth of the tree, but prove a source of infection for the fruit. In the ordinary pruning opera-

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Fig. 1. Fruit Spot (*Phoma pomi*) on Baldwins

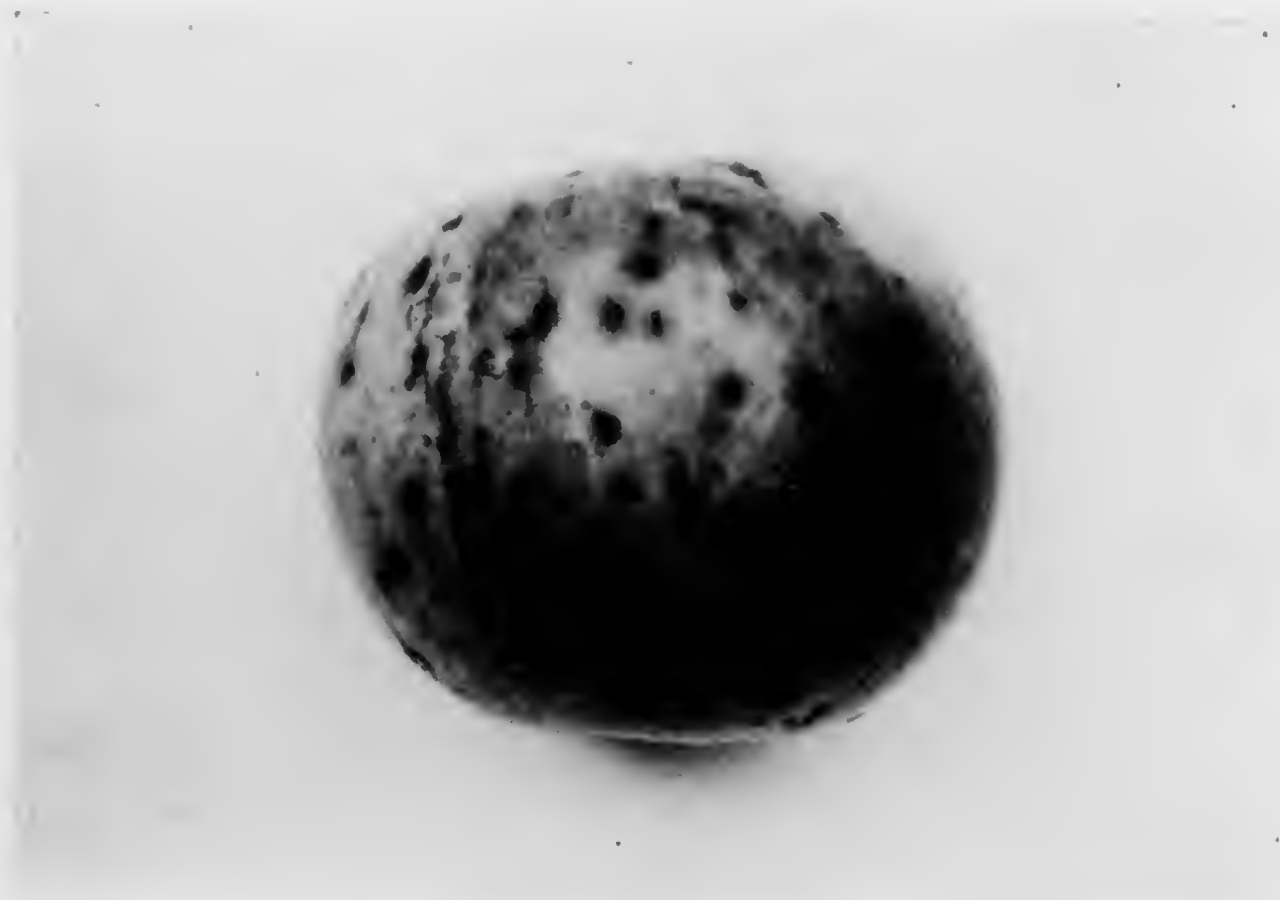


Fig. 2. Fruit Spot (*Phoma pomi*) on Rome Beauty

tions all cankers should be cut out and then burned as soon as convenient, certainly before the trees start in their growing season. Many fungous diseases live over in the fallen leaves—as with the “Apple Scab” fungus. It is not often convenient to eliminate them by burning in a commercial orchard, but plowing them under is the next best method. Providing the leaves are well covered or completely buried, little harm from them can follow. In this way the diseased fruit on the ground would be eliminated as a source of wintering the fungus.

From these suggestions, it is evident that spraying cannot succeed unless such factors as above mentioned are thoroughly practiced. All possible means should be taken to eliminate those obstructions which favor the presence and progress of the diseases.

The past season has been rather exceptional in the prevalence of several fungous diseases of the apple. While they have been known to be present in previous seasons, they have not been reported as causing any serious losses. I have special reference to the fungous diseases commonly known as Fruit Spot or Baldwin Spot, Apple Blotch, and Sooty Blotch.

The Fruit Spot or Baldwin Spot, known scientifically as *Phoma pomi*, was originally described by Brooks in New Hampshire where it was found commonly on the Baldwin variety of apple. Several cases this past fall have been called to the writer's attention, where one hundred per cent infection on the fruit occurred. The loss is hard to estimate. It is not concerned with a complete destruction of the fruit such as some of the storage rot fungi bring about, but the loss is from reduction in quality, as the value on the market of such infected fruit is much lowered. The injury is very superficial, and its progress includes but little of the pulp underneath the skin. It is first characterized by slight depressions, which on light colored apples are yellowish green. With the red apples the spots are darker. (Fig. 1.) The area affected, ranges in size from one-eighth to one-quarter of an inch in diameter. In a few cases under the speaker's observations they have become clustered so as to produce larger area of infection. In slight infections the spots are usually restricted to the blossom end, but also may be distributed quite widely over the fruit. Sometimes, minute brownish specks underneath the skin are evident, or are more conspicuous by carefully removing the skin. On a few varieties (Bellflower, Greening, etc.), a reddish discoloration of the skin occurs around the area of infection. As the spot matures, they become darker green on the light colored apples and on the red ones dark colored. On maturity the spots become more sunken. The spots now appear black and often irregular in outline and often minute black elevations are evident. (Figure 2.) The pulp underneath these spots, to the extent of a few cells, is corky. The margin of the spot is not sharply defined until it is matured. The blackened matured spots are quite conspicuous. The fungus attacks the fruit during its ripening period, and usually occurs from about the last part of July up to time fruit is picked, and it is

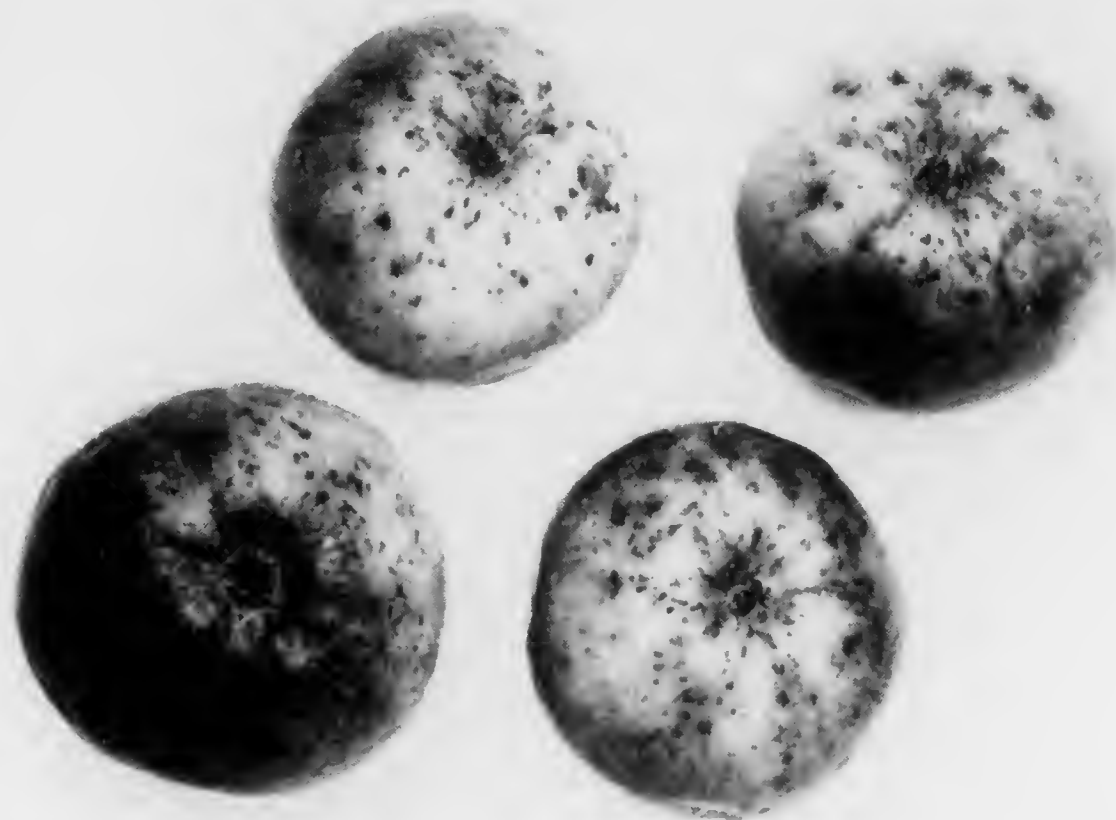


Fig. 1. Fruit Spot (*Phoma pomi*) on Baldwin.

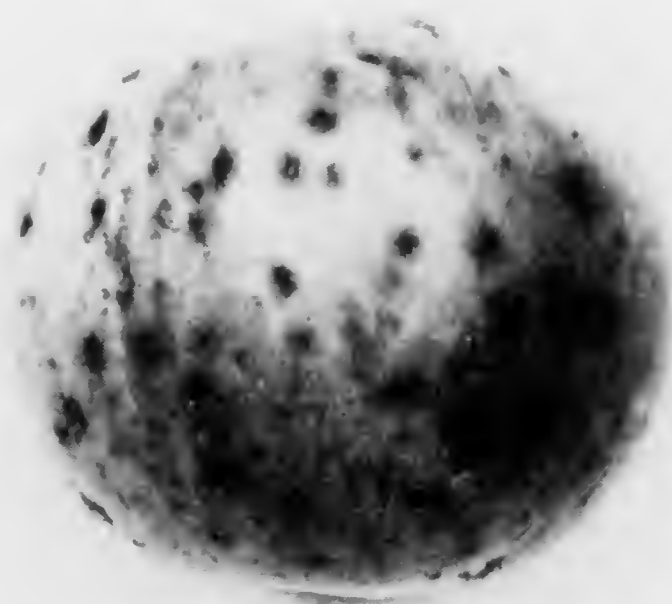


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The Fruit Spot or Baldwin Spot, known scientifically as *Phoma pomi*, was originally described by Brooks in New Hampshire where it was found commonly on the Baldwin variety of apple. Several cases this past fall have been called to the writer's attention, where one hundred per cent infection on the fruit occurred. The loss is hard to estimate. It is not concerned with a complete destruction of the fruit such as some of the storage rot fungi bring about, but the loss is from reduction in quality, as the value on the market of such infected fruit is much lowered. The injury is very superficial, and its progress includes but little of the pulp underneath the skin. It is first characterized by slight depressions, which on light colored apples are yellowish green. With the red apples the spots are darker. (Fig. 1.) The area affected, ranges in size from one-eighth to one-quarter of an inch in diameter. In a few cases under the speaker's observations they have become clustered so as to produce larger area of infection. In slight infections the spots are usually restricted to the blossom end, but also may be distributed quite widely over the fruit. Sometimes, minute brownish specks underneath the skin are evident, or are more conspicuous by carefully removing the skin. On a few varieties (Bellflower, Greening, etc.), a reddish discoloration of the skin occurs around the area of infection. As the spot matures, they become darker green on the light colored apples and on the red ones dark colored. On maturity the spots become more sunken. The spots now appear black and often irregular in outline and often minute black elevations are evident. (Figure 2.) The pulp underneath these spots, to the extent of a few cells, is corky. The margin of the spot is not sharply defined until it is matured. The blackened matured spots are quite conspicuous. The fungus attacks the fruit during its ripening period, and usually occurs from about the last part of July up to time fruit is picked, and it is

during this period that the fruit should be thoroughly protected. Where spraying has been neglected, a large infection of fruit has followed. This disease has been reported from nearly all the apple growing sections in the State. The following varieties of apple have been found infected this past season: Baldwin, Rome Beauty, Stark, York Stripe, Smoke House, Northern Spy, Grimes Golden, Jonathan, Ben Davis, Stayman, Summer Rambo, King, Black Jack, Gilliflower and York Imperial.

Apple blotch is caused by a fungus known scientifically as *Phyllosticta solitaria* which lives upon the leaves, fruit and twigs. The spots on the leaves are very small and are usually overlooked during the growing season. Infection on the leaves is seldom serious, and is only associated with prevalent canker infection. The more rapid growing twigs, water sprouts and fruit spurs are most subject to infection. The cankered areas are usually small, but when numerous, may run together affecting a large area and often girdling the twig. The large cankered areas are much roughened and slightly swollen. The cankers are usually reddish or tan colored, and minute black elevations appear in them which are the fruiting bodies of the fungus. (Figure 3.) Since the cankers serve to carry the fungus over winter by producing spores which cause infection on the leaves and the fruit, they should be cut out and burned. The Smith Cider variety of apple has been found particularly subject to this disease. Some trees have been found so badly infected that it has seemed best to remove them entirely. Grimes Golden, adjacent to badly infected trees, showed very little infection on the shoots, while the York Imperial seemed apparently free. While varieties show a marked difference in susceptibility to canker infection, apparently it does not hold true for the fruit. The fruit on York Imperial trees, growing adjacent to infected Smith Cider trees, were found to be badly infected. This will illustrate how a susceptible variety may prove a source of infection to other varieties. Much loss is experienced with the infection on the fruit. It appears upon the fruit from six to eight weeks after the petals fall. The spot at first is small and inconspicuous, but soon becomes evident as a collection of brown fibres just beneath the skin of the apple. These spots enlarge radially, and the advancing margin is fringed and irregular in appearance. Where the spots are numerous, they run together forming larger areas, often involving a considerable portion of the fruit. (Figure 4.) The affected areas usually become tan colored and are leathery in appearance and texture. The affected area often becomes sunken. With certain susceptible varieties the skin often cracks. The pulp underneath the diseased areas is affected deeper than in the case of Fruit Spot, and is corky or leathery in texture. The fruits should be protected during the period of infection, which extends from about July to middle of August. Where infection is not serious, the regular spraying schedule for apple, as later discussed, should prove effective. Where infection is severe, it is best to substitute Bordeaux mixture 4-4-50 strength for the last spray. Since there is considerable difference in varietal resistance, this fact should be considered in making future plantings.



Fig. 3. Apple Blotch (*Phyllosticta solitaria*) Cankers on Smith Cider. Note the small black elevations in the cankers which are the fruiting bodies of the fungus.

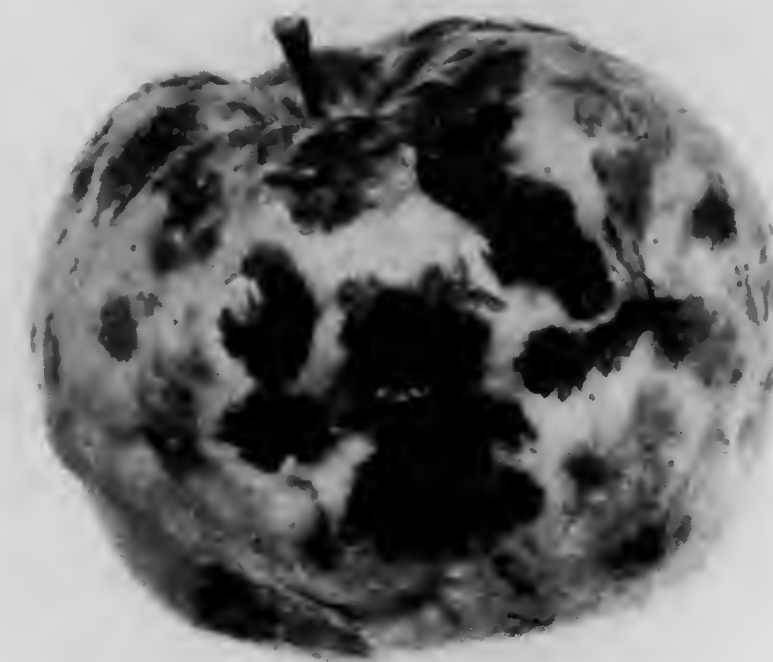


Fig. 4. Apple Blotch (*Phyllosticta solitaria*) and Red Bug injury on York Imperial. Note sunken areas of the old infection and the irregular margin of young infection.

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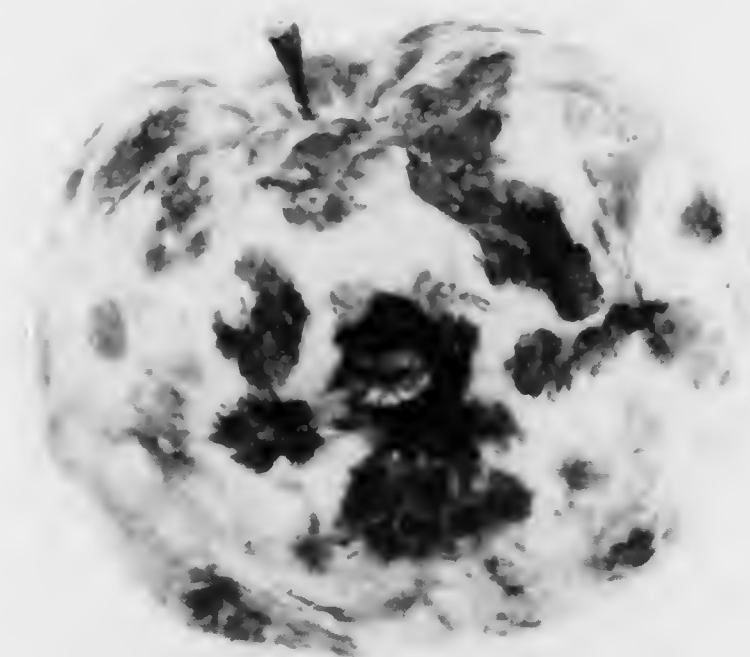


Fig. 4. Apple Blotch (*Phyllosticta solitaria*) and Red Bug injury on York Imperial. Note sunken areas of the old infection and the irregular margin of young infection.

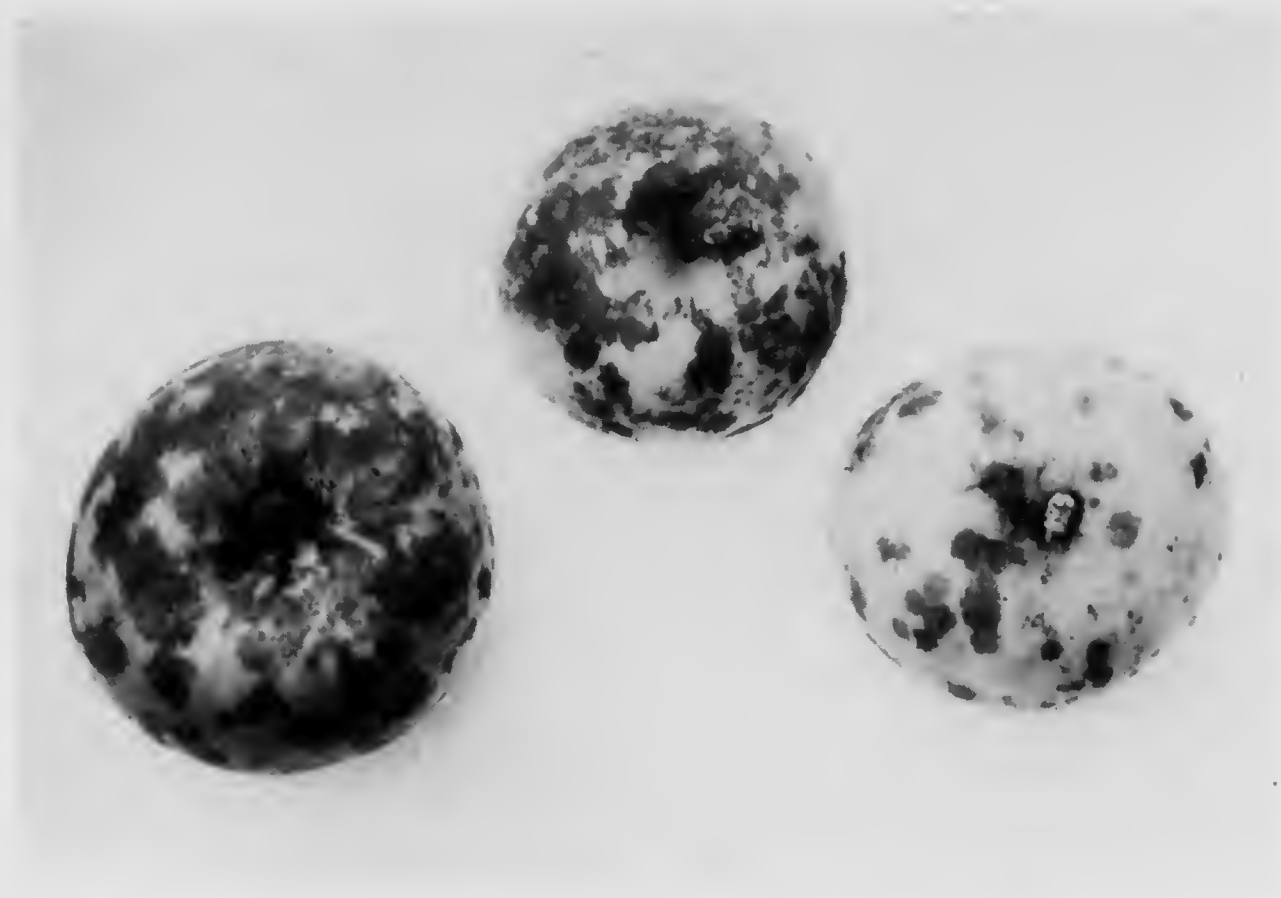


Fig. 5. Sooty Blotch (*Leptothyrium pomi*) on York Imperial

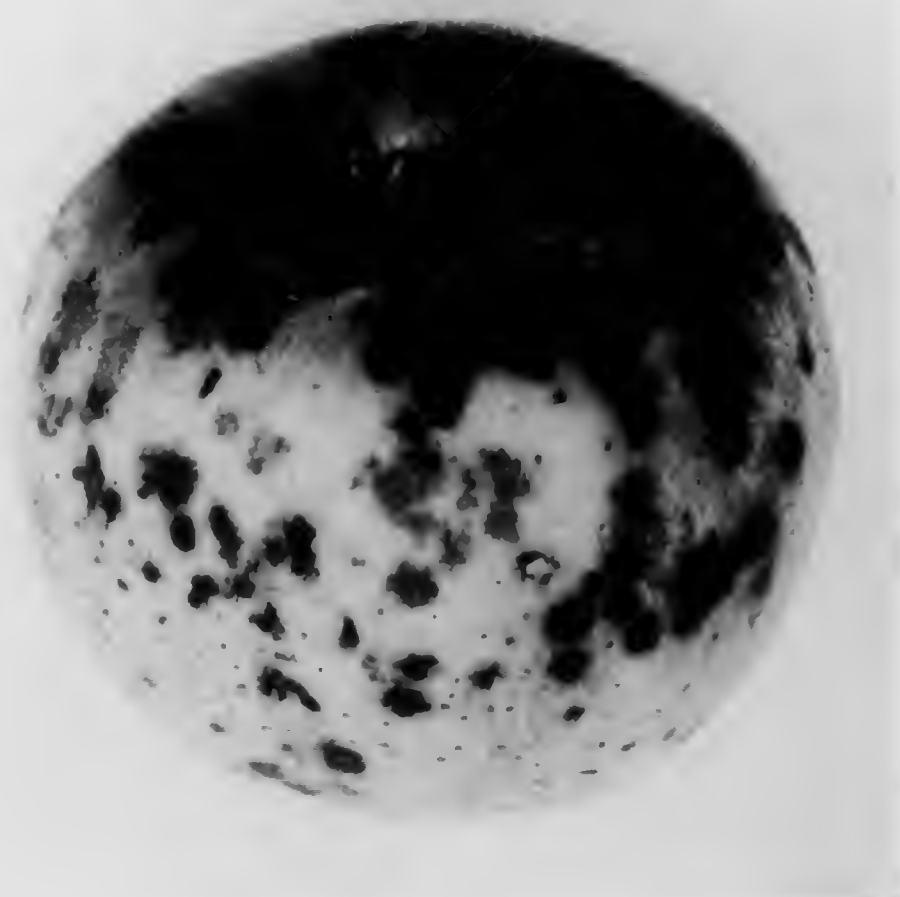


Fig. 6. Fly Speck (*Leptothyrium pomi*) and Apple Blotch (*Phyllosticta solitaria*) on Rome Beauty

Sooty Blotch and Fly Speck are caused by the fungus *Leptothyrium pomi*. This disease is particularly common—like the Apple Scab. It is prevalent in damp seasons or in moist, wet situations. Fruit that is well protected by the foliage, shows more infection than those exposed and which dry off the morning dew early in the day. The two names are associated with the type of growth the fungus develops. Both are superficial, and the only defect produced on the fruit is in the appearance. The Sooty Blotch areas (Figure 5) when numerous give the apple a clouded appearance, while the Fly Speck areas (Figure 6) are small and black. They may both occur on the same fruit. Infection occurs from about middle of July up to harvest time. The last two sprays, according to the spraying schedule for apple, are usually sufficient unless unfavorable weather conditions occur.

Apple Scab, scientifically known as *Venturia pomi*, is the most serious fungous disease we have to contend in the orchard. It is the most common on the leaves, twigs and fruits. On the leaves, olive-brown patches of the fungus are produced. The spores produced in these areas makes infection possible during the entire growing season. The fungus winters over on the fallen leaves, where a winter spore stage is produced. These spores are liberated in the spring so that the young leaves become infected. The fruit is subject to infection from its very young stage to harvest time. Infected young fruit usually becomes deformed and undersized. The scab spots on the fruit are the most familiar disease of the apple. (Figure 7.) The spots vary considerably in size and often expose a brown corky layer, which frequently cracks, allowing for infection of storage rot fungi. Some spots are often conspicuous by a whitish papery margin. Apple Scab may develop from old infections, under conditions of poor cellar storage, where moisture and temperature conditions are usually favorable. Since the fungus winters over in the old leaves on the ground, any means for their destruction will lessen the possibility of infection the following spring, as well as increasing the efficiency of the spraying.

The following spray schedule, for control of the common fungous diseases and insects affecting the Apple, has been prepared by the Pennsylvania State College School of Agriculture and Experiment Station.

SPRAY SCHEDULE FOR THE APPLE

(Where pests are known to be absent, omit corresponding spray or ingredient)

1. **Dormant Spray.** Preferably just as buds begin swelling. Lime-sulphur, 32° Baume, diluted 1 to 9*; or any lime-sulphur concentrate diluted to a density of 1.03†. For scale, blister-mite, scab and other diseases. If aphids are hatching, add nicotine solution as in No. 2.

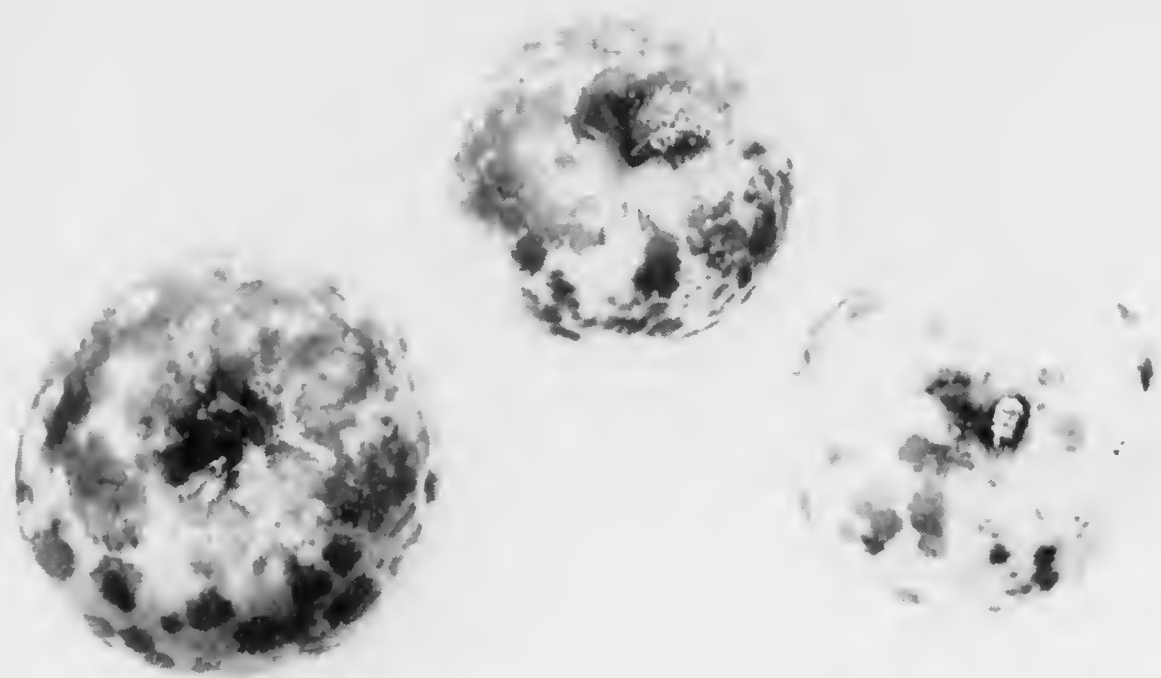


Fig. 5. Sooty Blotch (*Leptothyrium pomi*) on York Imperial

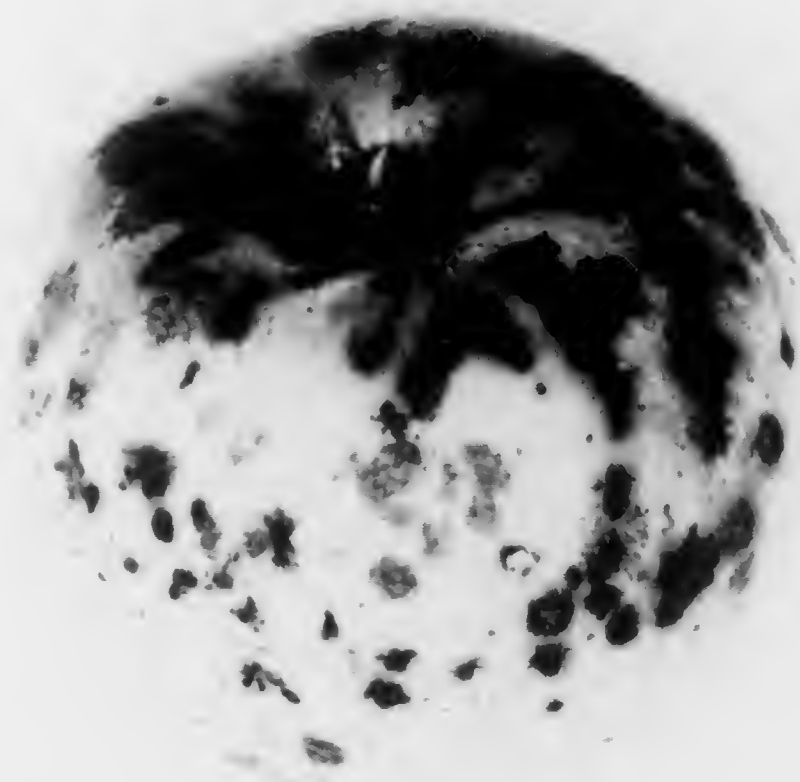


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2. Scab or "Pink" Spray. When blossoms first show pink, and flower clusters are spreading.

Lime-sulphur, 32° Baume, diluted 1 to 30*; or any concentrate diluted to a density of 1.01. For scab or other diseases.

Add tobacco extract (40% nicotine) ½ pint to 50 gallons, for red-bugs or aphids.

If canker worms, bud-moth or other leaf eaters are present, add lead arsenate, 3 lbs. of the paste, or 1½ lbs. of the powder in 50 gallons.

3. First Codling Moth or "Calyx" Spray. May start when ⅔ of the petals are off, and should be finished within 7 days after all petals fall.

Lead arsenate, as in No. 2, for codling moth, curculio, and other fruit or leaf eating insects.

Lime-sulphur, as in No. 2, for scab and leaf spot.

If red-bugs or aphids present, add nicotine as in No. 2. (Use plenty of spray and direct it to fill calyx cups).

4. Second Codling Spray. About 2 weeks after the completion of No. 3, although best applied when moths actually begin emerging as determined by cage observations in orchard.

Lead arsenate and lime-sulphur as in 2 and 3.

For codling moth, curculio, and other insects, scab, sooty blotch, apple blotch and fruit spot.

5. Late Summer Spray. About last week in July. (If second brood codling moth are bad, time this spray by banding a few trees and watching for cocoons to empty).

Materials same as in No. 4. For second brood of codling moth, late feeding caterpillars, scab, sooty blotch, apple blotch, and fruit spot.

Where bitter rot or apple blotch is serious, bordeaux mixture (4-4-50) may be substituted for the lime-sulphur, and one or two additional applications may be made when needed.

*The second figure in all these dilution rates indicates the **total volume of spray** obtainable from one volume of concentrate. The amount of concentrate required to make up a tank of spray may be found either by **consulting the table below**, or by **dividing the capacity of tank by the second figure in the dilution rate**.

†The dilution rate needed to obtain sprays of any desired density may be obtained directly by testing the concentrate with a specific gravity hydrometer, and then dividing the decimal part of the concentrate reading by the decimal of the desired spray. Examples:

$$\frac{(1).27}{(1).03} = 9; \quad \frac{(1).24}{(1).01} = 24.$$

The result shows the total dilution required. Also see table following.



Fig. 7. Apple Scab (*Venturia pomi*) on York Imperial

Amounts of Lime-Sulphur Concentrate Required to Make 50 Gallons of the Principal Spray on the Apple

Reading on Hydrometer		Lime-Sulphur Concentrate Required		
Baume Degrees	Specific Gravity	Dormant Spray, 1.03	Scab Sprays, 1.01*	Later Sprays, 1.008
		Gals. L-S.	Gals. L-S.	Gals. L-S.
20	1.160	9.4	3.1	2.5
21	1.169	8.9	2.9	2.4
22	1.179	8.5	2.8	2.2
23	1.188	8.1	2.7	2.1
24	1.198	7.6	2.5	2.0
25	1.208	7.2	2.4	1.9
26	1.218	6.9	2.3	1.8
27	1.229	6.6	2.2	1.7
28	1.239	6.3	2.1	1.7
29	1.250	6.0	2.0	1.6
30	1.261	5.7	1.9	1.5
31	1.272	5.5	1.8	1.4
32	1.283	5.3	1.8	1.4
33	1.295	5.1	1.7	1.4
34	1.306	4.9	1.6	1.3
35	1.318	4.7	1.6	1.3
36	1.330	4.5	1.5	1.2

In Pennsylvania, the grower of peaches is concerned with three important fungous diseases, the peach leaf curl, the brown rot and the peach scab.

The peach leaf curl, scientifically known as *Exoascus deformans*, is found only on the leaves and younger shoots and serious injury to these parts of the host result in a crop of poor quality and under-sized fruits. In cases where early falling of the leaves occur, it necessitates the development of a new crop, which usually results in the tree maintaining growth too late in the fall with a susceptibility to winter killing. The characteristic curling of the leaves is the familiar symptom to all, but the disease goes further in its attack on the host by infecting the twigs. The infection on the twigs is often overlooked, as a slight swelling is produced, which does not possess the usual symptoms of a canker. If the terminal part is infected, it is usually killed and such infections should be cut out. The first spray, or dormant spray, will usually hold this disease in check. This is practically the only fungous disease of fruit trees for which a dormant spray is important.

The brown rot of peach, *Sclerotinia cineria*, is the same fungus that causes similar injury to the plum and cherry. In some seasons it is more serious than others, due to such favorable atmospheric conditions as existed in the season of 1915. The appearance and destructiveness is familiar to all, and when warm, moist weather

*This strength is usually safe and preferable in all foliage sprays on the apple, but the lower strength shown in the last column may be used wherever there is any important danger of spray injury.

prevails, the ripening fruit is often completely involved and reduced to a mummy. Over the rotted areas are developed powdery greyish tufts of the fungus, which are the spores that are easily carried by the wind or washed to other parts of the host to spread infection. Where fruits rub against each other, or are in contact with twigs and leaves, there are produced favorable places for infection. Any means to insure rapid drying off of the fruit, by thinning or pruning, is of importance in checking this disease. Careful attention should be given to the removal of the mummies hanging on the tree, as these may prove a source of infection the following season. Those mummies falling to the ground and becoming covered with soil, produce another spore stage the following season or the second season. From these partially covered mummies develop small stalked, cup-like bodies of a brown color and hardly distinguishable. Masses of spores are produced by these cups, which are discharged and carried about by the air currents about blossoming time. The so-called blossom blight stage occurs, which is often considered the result of cold weather rather than the infection by the fungus. This resting stage of the fungus may be prevented by plowing the fallen fruit under for a depth of at least three inches. Often the disease goes further than the fruit and causes a canker of the twigs. These usually can be recognized by the formation of gum and a roughened appearance of the bark. The fungus once established, lives from year to year, and produces an annual crop of spores. If the canker does not girdle the branch, it causes a very uneven growth which lessens the development of the distal parts. Where practical, especially on the small branches, the cankers should be removed. On the larger limbs this is not practical, but in this case the diseased part should be removed and carefully protected by some form of tree paint. Where the gum collects, the wood underneath is usually dead, but such areas can be prevented from spreading by the proper application of tree surgery. The use of self-boiled lime-sulphur, as recommended in the spray calendar for peach, is usually efficient for the treatment of brown rot, providing the above mentioned methods of control are practiced.

Peach scab, or *Cladosporium carpophilum*, is fully as common as brown rot, but not so destructive, and usually the only effect is in the appearance of the fruit. In some sections it is known as "black spot" or "freckles." However, in severe cases of infection the fruit is often cracked, allowing for infection by the brown rot fungus. Underneath the affected areas the tissue does not develop normally which often imparts a bitter flavor to the peach. Young infected fruit fails to develop normally, and often in serious infections they may drop prematurely. The diseased spots are usually circular and dark brown, but when numerous may involve such a large area as to give the fruit a sooty appearance. Infection also occurs on the shoots where small brown spots are produced, which may annually produce spores to spread infection to the fruit. Scab may infect the fruit when young, the infection period being about three to four weeks after petals fall, but it is sometime later that its symptoms on the fruit are recognized.



Fruit from sprayed and unsprayed trees, showing the effect of self-boiled lime sulphur on scab.

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Fruit from sprayed and unsprayed trees, showing the effect of self-boiled lime sulphur on scab.

SPRAY SCHEDULE FOR PEACHES

(Destroy all mummied fruit before growth starts)

1. **Dormant Spray.** In spring, **before** buds start.
Lime-Sulphur, 32° Baume, diluted 1 to 9 (total), or any lime-sulphur concentrate, diluted to a density of 1.03; for San Jose scale and leaf curl.
For lecanium or other soft scales, use miscible oil, as recommended by manufacturers.
2. **Curculio Spray.** When the husks or calyces are being shed.
Lead arsenate paste, 3 lbs. to 50 gals., and 2 lbs. lime, slaked.
Add tobacco extract (40% nicotine) ½ pint to 50 gals., if aphids are serious.
3. **First Brown Rot and Scab Spray.** 3 or 4 weeks after No. 2.
Self-boiled lime-sulphur (8-8-50); for brown rot and scab.
If curculio is serious, add lead arsenate paste, 2 or 3 lbs. to 50 gallons.
4. **Second Brown Rot and Scab Spray.** About 4 weeks before fruit ripens.
Self-boiled lime-sulphur (8-8-50); for brown rot and scab.
Where staining of fruit is very objectionable, lime-sulphur solution alone, 1.003, or 32° Baume concentrate diluted 1 to 100, may be substituted on varieties that are fairly resistant to spray injury.

TABLE II

Amounts of Lime-Sulphur Concentrate Required to Make
50 gallons of the Principal Sprays on the Peach

Reading on Hydrometer		Lime-Sulphur Concentrate Required	
Baume Degrees	Specific Gravity	Dormant Spray, 1.03	Possible Final Spray, 1.003
		Gals. of L-S.	Quarts of L-S.
20	1.160	9.4	3.8
21	1.169	8.9	3.6
22	1.179	8.5	3.4
23	1.188	8.1	3.2
24	1.198	7.6	3.0
25	1.208	7.2	2.9
26	1.218	6.9	2.7
27	1.229	6.6	2.6
28	1.239	6.3	2.5
29	1.250	6.0	2.4
30	1.261	5.7	2.3
31	1.272	5.5	2.2
32	1.283	5.3	2.1
33	1.295	5.1	2.0
34	1.306	4.9	2.0
35	1.318	4.7	1.9
36	1.330	4.5	1.8

BUSINESS MEETING

W. J. LEWIS, Pittstown, Pa., Presiding Officer

The chairman called for report of the nominating committee. Committee reported as follows:

For President, W. J. Lewis, Pittstown, Pa.

For three elective Vice Presidents:

F. H. Fassett, Meshoppen, Pa.

George W. Kessler, Tyrone, Pa.

P. S. Fenstermacher, Allentown, Pa.

For Secretary, F. N. Fagan, State College, Pa.

For Treasurer, Edwin W. Thomas, King of Prussia, Pa.

It was moved by Mr. Chase that the report of the nominating committee be accepted and that the Secretary be instructed to cast a ballot for the election of the above named officers. The motion was seconded and passed.

Place of Next Meeting

It was moved by Mr. Tyson that the place of next meeting be left in the hands of the executive board. The motion was seconded and passed. The chairman then called for Old Business.

R. L. Watts speaking in behalf of the Vegetable Growers moved that the amendment to the Constitution, which was presented to the Association at the Wilkes-Barre Meeting in 1915 be withdrawn without further action.

The amendment proposed in 1915 was as follows:

ARTICLE—Amendment to the Constitution—Members of the Association who are especially interested in vegetable gardening shall have the privilege of organizing a Vegetable Growers Division, with power to elect such officers, to appoint such committees, and to undertake such work as the Division may decide. Half the annual dues of those designing preference for membership in the Vegetable Division shall be paid to the Treasurer of the Horticultural Association and half shall be used in defraying the expense of the Vegetable Division. The Division shall exercise full authority in preparing and printing programs, but the proceedings of the Division shall be published in the annual report of the Association.

R. L. WATTS, M. G. KAINS,
C. A. GREIST, HARRY PIERCE,
C. E. MYERS.

Amendment to Article 3 of the Constitution, that the following clause shall be inserted "the President and Secretary of the Vegetable Division shall be members of the Executive Board."

R. L. WATTS, M. G. KAINS,
C. A. GREIST, HARRY PIERCE,
C. E. MYERS.

This Old Business was taken off of the table and voted on by the Convention, passing the motion of R. L. Watts to withdraw said Amendment. Carried.

It was moved by Mr. C. J. Tyson that the Association welcome back the Vegetable Members and to recommend to the executive board four separate sessions to be held in connection with the annual meeting for the Vegetable Growers. This motion was seconded by Mr. Chase and was passed by the Association.

NEW BUSINESS

Mr. Chase made the following announcement: that he would propose in regular form before next annual meeting the following Amendments to the Constitution. Under Article 2, strike out the words, "for the current year."

In Article 6 to strike out "the regular meeting of the Association shall be closed to all persons except paid-up members."

AUDITORS' REPORT

Harrisburg, Pa., January 23, 1917.

We, the undersigned, have examined the treasurer's accounts and vouchers and find the same to be correct, showing a balance of \$50.13 in the general account and \$100.00 in the Life Membership Fund.

(Signed) W. E. GROVE,
RALPH GIBSON,
I. H. COURSEN.

Moved and seconded that the Auditors' Report be accepted. Passed.

THE TREASURER'S REPORT

RECEIPTS

Cash balance 1-18-16.....	\$ 2.01
1-21-1916—From J. A. Runk, Annual dues.....	308.00
1-25-1916—From F. N. Fagan, Annual dues.....	16.00
6- 7-1916—From F. N. Fagan, Annual dues.....	54.00
6- 7-1916—From F. N. Fagan, State College Refund.....	10.18
6- 7-1916—From F. N. Fagan, Reading Meeting.....	9.50
7-18-1916—From F. N. Fagan, Sale of One 1916 Report.....	1.25
1-13-1917—From F. N. Fagan, Annual dues.....	92.00
1-13-1917—From John Welsh Dulles, Annual dues.....	2.00
1-13-1917—From Henry Roeber, Annual dues.....	2.00
1-19-1917—From Interests on Life-Membership Fund.....	2.85
	\$499.79

DISBURSEMENTS

2-10-1916—To Arthur J. Farley.....	\$ 37.69
2-10-1916—To H. B. Knapp.....	29.58
2-10-1916—To M. J. Krull.....	49.46
2- 1-1916—To C. R. Orton.....	19.56
4- 1-1916—To J. L. Rupert.....	10.75
7-18-1916—To Republic Bank Note Co.....	169.29
7-18-1916—To The Pennsylvania State College.....	23.16
7-18-1916—To S. H. Fulton.....	32.85
7-18-1916—To D. H. Luce.....	23.00
1-18-1917—To Torsch & Franz Badge Co.....	8.57
1- 9-1917—To F. N. Fagan.....	45.75
1-23-1917—To Balance, Cash on Hand.....	50.13
	\$499.79

Chairman then called for the report of the Resolutions' Committee.

THE REPORT OF THE RESOLUTIONS COMMITTEE

1. Whereas, after hearing Prof. Sanders' paper this morning, be it resolved that we heartily approve of Prof. Sanders' plan for preventing the spread of the new insect that is proving so destructive to peach trees in the vicinity of Washington, D. C. Be it further resolved that it seems of the utmost importance that the State Authorities should at once consider measures for the control of this pest.

2. Whereas we believe that Prof. John P. Stewart's Experiments in apple growing for the past several years have proven of wonderful value to the fruit growers of Pennsylvania and elsewhere, resolved that we urge the authorities to continue these experiments, and such others affecting the business of fruit growing not already provided for.

3. Whereas our ranks have again been invaded by death and our president, Dr. I. H. Mayer of Willow Street, Lancaster County, has been removed from us, resolved that we approve of the fitting tribute to his life and valuable services, read by Mr. C. J. Tyson of Adams County.

We have to commemorate, also, the death of Mr. Jacob Shaffner, a life member for many years, who died at his home in Harrisburg during the past year. He was closely identified with the objects and work of this association during the entire time of his membership.

Respectfully submitted:

MR. ANDERSON,
MR. FOSSETT,
MR. BRINTON,
MR. GREIST,
MR. PERSHING.

January 24, 1917.

Thursday, January 25, 1917—9:30 A. M.

President W. J. LEWIS in the Chair

The Chairman: You will notice, by our program, that the session this forenoon is to be entirely taken up by the discussion of Uniform Package, Packing and Grading Legislation. Our Legislative Committee will open the discussion; Ralph Gibson, of Williamsport, Chairman.

Mr. Gibson: While I happen to be the Chairman, Mr. Tyson is so much more familiar with the subject, that I have asked him to present the conclusions of the Committee. He knows something more about the history of these grading and packing laws than I do.

WE RECOMMEND OUR ADVERTISERS

Mr. Tyson: As you have noticed from the minutes of the last two annual meetings, the matter of State Legislation along the lines of grading and packing of apples has been of interest to our Association, partly because I think most of us realize that there is room for a lot of improvement in our packing methods; partly, also, because a great many of the nearby states have taken steps along this line and several of them, New York, Delaware, Maryland and a number of the New England States—Virginia has a law practically in shape—are already lined up with rather definite laws along the line of apple grading and packing and branding; so that it seemed perfectly proper for your State Association, with its prime interest, that of the fruit grower, to take cognizance of what is being done along this line. There has been a pretty strong feeling, taking shape in the action of this Association last year, that anything very radical at that time and possibly at this time, would be premature; in fact, your Committee last year gave, as its recommendation, that the State Association go slowly in the matter of recommending apple packing and grade legislation; and the whole feeling of the meeting at that time seemed to be along that line. However, the Committee has had the matter in mind more or less all through the year; the working out of the laws in some of these other states has been watched pretty closely, and a great many people have been written to, and interviewed, as to their feeling along this line, the general conclusion being that the demand for some legislation along this line has grown to the point where it must be recognized; that the demand for some regulation entirely outside of the members probably who are gathered here, coming from fruit handlers, from wholesale handlers of fruit, from the retail handlers of fruit, from the ultimate consumer of fruit, has grown to such size that it **must** be recognized, and has grown to such proportions that we may expect some measure to be introduced in the coming session of the Legislature affecting this matter. We all know from observation how those things work. An agitation, possibly on the part of some consumers' club, may start up; a man buys a barrel of apples and gets a lot of junk in the middle of it, he feels sore, is an influential man and starts something, and a movement of that kind can very soon reach such proportions that it is entirely out of our reach. Realizing that a lot of agitation of that kind is already alive, some of us have felt that the wise thing, instead of opposing a movement of that kind, is to try to shape it, and with that assumption, we have tried to see what legislation might be wise at this time. Now a good many of you are more or less familiar with the New York Apple Package and Grade Bill, or law, as it has been in operation, amended, for about four years; in the present form for two years. Some of you are also familiar with the law passed by Maryland, which went into effect last year, but which they really have not enforced yet, and somewhat more drastic than the New York law. Both of those laws established certain grades for apples in closed packages, barrels, boxes or other packages that are not readily seen when packed for sale. They establish a fancy grade with certain requirements; they establish an A grade and a B grade, and an unclassified or orchard run grade

for those who do not care to pack under either of the other grades. Those grades are figured on the basis of percentages of normal color or good color for the variety, and percentages of allowance for defects. They provide for the inspection of the packages at the point of packing, or at the point where they are offered for sale, and establish penalties for misbranding and for adulteration, which items are defined. There are some of those laws go still further and provide requirements that the face of the barrel shall fairly represent the contents, and define what they mean by "fairly." The Committee having this matter in charge, a great many of the better fruit growers and quite a number of the commercial fruit growers of the State that have been consulted, feel positive that a law along that line would be a good thing for Pennsylvania; that whatever the immediate result might be, that the ultimate result would be a splendid thing for the fruit growing interests of Pennsylvania. But we have recognized the fact that, whereas New York is largely a commercial apple growing State, Virginia—as was explained to us yesterday by Dr. Fletcher, who is, as you know, very closely familiar with the conditions in Virginia—is almost entirely commercial in its apple growing interests. Very rarely, in either of those states, do we find what we know as the farm orchard, contributing, as it does in our state, really tremendous amounts of fruit to the total of the fruit of the State. Now, I don't know, we probably represent the commercial fruit growers of the State and will say that we have made it our business and that our interests are the ones that should be considered in this matter; yet we have a great big state and have orchard interests scattered over practically the whole of it, and I do not feel that we have the right to absolutely wipe the other fellow off and say that the way we think this thing should be done, for our own interests, is the only way. Not only that, but entirely from the view point of what we may be able to do, that would not be a wise thing probably, for us to try. When we come up to our Legislature, the other fellow who has the smaller interests and who would be affected, would have just as much "say" as us, so that your Committee felt that the time probably was not ripe for Pennsylvania to adopt a law with the complicated, drastic requirements of the two states I have just referred to; not, as I say, because we condemn those laws at all, because we feel that they really would be a splendid thing for Pennsylvania, and not only for the large grower but the small grower, if they could be brought about and enforced and carried out throughout the State. We feel, too, that in a state like Pennsylvania, where the fruit growing interests are so scattered, and occur in small spots as you might say, that the cost of inspection, the cost of enforcement of a law so complicated as either of these other laws are, would be a burden that it would not be wise to ask our Legislature to take up right now; it would meet severe opposition on that score alone. We do feel, however, that it is entirely possible to go into this matter and take it up to a certain point. We feel that there are certain things that probably all of us can agree on, certain things that will do nothing but help us, certain things that most of us are already doing, things that the smaller

growers ought to be required to do and which will certainly bring no hardship on any of them. Moreover, the things that we expect to propose in this bill can be enforced with very little, if any, addition to the present machinery of our State Department of Agriculture, because they are things that can be inspected in a short time and that do not require any special training, as you will see when I read what we propose. Now I think that is a pretty general outline of what has led up to legislation along this line in Pennsylvania, and an explanation of why we have gone just as far as we have in our proposal. We have not arrived at it without a lot of thought and a lot of pretty serious work, and we do not hold ourselves up at all as being absolutely right. We only felt that since the matter had been entrusted to our care, it was right for us to give our very best attention to it and present the matter to this meeting for your more mature consideration; and that is of course what we want, and while we shall ask your approval of our report, we want your discussion of it, and if you can see that it is wrong in any way, of course we want you to change it. This is what we propose. Before going into this I feel like saying just a little bit more. You are all more or less familiar with the working of the Bureau of Markets in the Department at Washington; that Bureau has, for sometime, recognized just as we have, that interest is alive all over the country in the matter of legislation of this kind. They have recognized the fact, that state legislation would not be complete without some time having a Federal law affecting interstate commerce in this matter; they recognize the fact that if the states here and there all over the country pass laws, here a law with one requirement, there a law with another requirement and here still another one, differing, that it would be an awful mess some day to try to get those states lined up so as to work under a Federal Interstate Commerce law that would cover the whole situation; and sometime ago, as I say, it looked wise to them to keep in touch with the situation and learn, as far as they could, the feeling that was back of these different movements in different states, and, if possible, at least somewhat guide the passage of these laws, so that, while they would meet the requirements in the several states, they would not do anything that would seriously conflict with making the thing work together after awhile. I bring this up now because we feel like giving credit to the Bureau of Markets and to their particular workers in that line. Mr. Hetzel, of that department, who is with us this morning, has given us invaluable assistance along this line; he has pointed out ways in which things that we had in mind, without any particular reason in most cases, might conflict with the further movements along this line, and he has also shown us some instances where we were in danger of making some pretty serious mistakes, which we saw after he pointed them out to us, and I feel like giving that department and Mr. Hetzel credit for a lot that we have done. As I say, we have done a lot of work along this line, and we worked until considerably past midnight last night finishing it up, and the report will have to be made from some original work here that has been interlined, so if I blunder, you will have to excuse me. As a suggestion, if you are willing, I

would like to read our proposal right through so that you will get the connection all the way through, and then if it is your wish, I suppose it would be proper to take it up section by section. Of course, there probably would have to be additions of legal terms, that would make this comply in every way with our State requirements, but in general we think it is about right.

Mr. Tyson then read the proposed Act as follows, being the form in which the bill was finally approved and presented to the 1917 session of the Legislature.

PROPOSED LAW

AN ACT TO FIX STANDARDS AND TO REQUIRE CERTAIN MARKS WHEN PACKED IN CLOSED PACKAGES AND FOR OTHER PURPOSES

As reported by the Legislative Committee and approved by the Association.

SECTION 1. Every closed package containing apples grown in the State of Pennsylvania which is sold, offered, or consigned for sale, packed for sale, or shipped for sale, shall bear upon the outside of one end in plain letters or figures, or both, the name and address of the person by whose authority the apples were packed; the true name of the variety therein contained and the minimum size of the fruit in the package, provided that packages which cannot be readily marked on an exposed end shall be similarly marked in a conspicuous place. If the true name of the variety is not known to the packer or the person by whose authority the apples are packed or branded, then such variety shall be designated as "unknown." Every package of apples which is repacked shall bear the name and address of the person by whose authority it is repacked, in addition to the other marks prescribed by this Act. The letters and figures used in marking or branding closed packages of apples under the provisions of this Act, shall be of a size not less than thirty-six point Gothic.

SEC. 2. The marks and brands prescribed in this Act may be accompanied by any additional marks or brands which are not inconsistent with, or do not in any way obscure the marks and brands required by this Act. Apples packed and branded in accordance with the United States Apple Grading Law approved August third, nineteen hundred and twelve, shall be exempt from the provisions of this Act.

SEC. 3. All apples packed within the meaning of this Act shall be so packed that the face or exposed surface shall fairly represent the average of the apples in the package. And it shall be considered a fair representation if the face or exposed surface does not excel the average of the apples in the package by more than 15 per centum in the matter of size and freedom from defects.

SEC. 4. The minimum size of the fruit in all grades shall be determined by taking the transverse diameter of the smallest fruit in the package. Minimum sizes shall be stated in variations of one-quarter of an inch, as two inches, two and one-quarter inches, two and three quarter inches, three inches, three and one-quarter inches, and so on, in accordance with the facts. Minimum sizes may be designated by either figures or words and the word "minimum" may be designated by the use of the abbreviation "min." A tolerance of 5 per centum in the matter of size shall be allowed.

SEC. 5. It shall be unlawful for any person to pack for sale, ship for sale, offer or consign for sale, or sell, in closed packages, any apples grown in this State which are not marked or branded in accordance with the provisions of this Act and the regulations made hereunder, or closed packages of apples bearing any false statement, design, or device regarding such apples within the meaning of this Act.

SEC. 6. Any person who violates any of the provisions of this Act, or of the regulations promulgated hereunder, shall be deemed guilty of a misdemeanor,

and upon conviction thereof, shall be punished by a fine of not more than fifty dollars for the first offense and not more than one hundred dollars for each subsequent offense; provided, that no person shall be prosecuted under this Act who can establish by satisfactory evidence that no part of the packing or branding of the apples concerned was done by him or under his authority, and that he had no knowledge that they were not packed and branded in accordance with said provisions and said regulations:

SEC. 7. The provisions of this Act shall not apply to apples in closed packages which are held, stored or shipped to storage within the State, until the same are packed for sale, offered or consigned for sale, or shipped for sale.

SEC. 8. The word "person" as used herein shall be construed to include individuals, corporations, partnerships and associations. The act, omission or failure of any official or employee of any person, when such official or employee is acting within the scope of his employment or office, shall, in every case, be deemed also the act, omission or failure of the person, as well as of the official or employee. The words "closed package" shall mean a box, barrel or other package, the contents of which cannot be easily inspected when such package is closed.

SEC. 9. The enforcement of this Act shall be vested in the State Department of Agriculture, and its officers, employees and agents are authorized to enter upon the premises of any person within this State for the purpose of inspecting packages of apples and securing evidence of violation of this Act, and the said Department of Agriculture is hereby authorized and empowered to make, promulgate and enforce such regulations as may be necessary for interpreting the specifications prescribed in this Act, and for otherwise enforcing its provisions; provided, however, that any requirements for marking closed packages containing apples, which may hereafter be established by the authority of the Congress of the United States shall forthwith, as far as applicable, be established and promulgated by the Department of Agriculture as the official grades, classes and marks for apples packed in closed packages in the State of Pennsylvania.

SEC. 10. This Act shall take effect September 1st, 1917.

SEC. 11. All laws and parts of laws in conflict with this Act are repealed.

Mr. Creasy: I would like to ask whether that includes apples packed in barrels and covered with canvas covers, as is done a good deal in the coal fields?

Mr. Tyson: In other states where this law has been passed, that has been construed to cover apples packed in barrels and covered with canvas covers. We have no more right to ship a dishonest pack with a canvas cover than with any other cover.

Mr. Creasy: Is the law so fixed that when you ship apples with the understanding that they are ungraded—

Mr. Tyson: We do not fix any grades; all we require is that the minimum size of the apples in each package be marked, and that it be marked with the name and address of the man who ships the apples.

Mr. Creasy: I grow a good many early apples; we cannot always wait on the size, and this work is done pretty quick sometimes and they are sold to our hard-coal fields.

Mr. Tyson: You ship those early apples, whereas you might ship winter apples with a minimum size of 2½ inches, you ship the summer apples probably with a minimum size of 2 inches; all you have to do is to mark "minimum size 2 inches," on the package;

that is all the State requires; it does not fix any standard sizes or weights at all, it simply requires that the package be marked with the facts.

Mr. L. M. Myers: You have no provision for ungraded fruit, you would not allow an ungraded package?

Mr. Tyson: What do you mean by ungraded?

Mr. Myers: I see that in other states they have ungraded packages, marked "ungraded" without any size.

Mr. Tyson: No, I think there are none of the state laws that have an ungraded feature that allow them to pack apples without reference to size. They all, New York, Virginia and Maryland, all require that the package contain the minimum size of the fruit in the package, even in their "unclassified" grades.

Mr. Myers: There is another clause in there, I don't know whether I have the wording exactly, but packages not easily inspected or closed packages—I mean it does not apply to a bushel package without a cover?

Mr. Tyson: The construction usually put on that matter in other states is that a hamper or bushel basket with a tight slat cover fastened on in the usual way, is a closed package of apples. If we are going to consider this at all, may we not take it up section by section?

It was moved by Mr. Creasy that the bill be taken up section by section. The motion was seconded and carried and the first section was read, with the following explanation:

Mr. Tyson: Now the sentence I am going to read is supposed to cover apples packed in canvas-topped barrels, or in baskets that are not readily marked in accordance with what I have just read—"Provided that packages not readily marked on an exposed end, shall be similarly marked in an exposed place."

The Chairman: That is the first section; now if there is any discussion or anything you object to in this first section, let us hear from you.

Mr. Gibson: That is the meat of the bill.

Mr. Tyson: Section one contains the provisions that we felt it was wise to stand behind, and is, as Mr. Gibson says, really the meat of the bill; the balance is machinery to carry it out.

Mr. Creasy: One point I am not quite clear on yet is, we have a lot of these early apples and some of them do not keep as long as strawberries, and it would seem to me, as this work is generally done very cheap, that it would be well if we could have a proviso in there that if there was an understanding between the grower and the commission man that they were ungraded, they could pass without marking the size on them. Sometimes the size of apples is small and yet they are good apples; it depends a great deal on the quality; what hurts the sale of apples is when you mix a lot of very inferior stuff with some that is better, regardless of size.

Now, the thing that would annoy me in that bill is in regard to these early apples. If there could be an understanding between the commission man and myself that they were ungraded, it would save me a lot of work. Perhaps I can't see after this work; I couldn't see after all the apple business, with a lot of other things going on, and shipping to a market where we come in competition with these orchard apples that will be sold cheap; there is no way of getting the money to pay for an experienced grader. It has been my experience in the hard-coal fields, that it is really the poor grade that fixes the price of the apples. As far as the other apples are concerned, that is somewhat different; I would agree to that, but I am afraid that provision would annoy us with the early apple; they do not keep, some of them, as long as strawberries.

A Member: In order to bring the matter before the meeting for discussion, I move the adoption of the first section as read.

Motion seconded.

Mr. Chase: There would be some considerable force, I think, in what Mr. Creasy has said; further than that, in the eastern part of the State, there are many comparatively small growers, farmers who have 50 or 100 trees, who are in the habit of shipping practically the run of the trees in second-hand, cheap barrels, with canvas or burlap tops. With them it is not, as you can realize, the run of the tree means not the size, the quality, the variety; there are some perfect apples and some imperfect. There are others who have those apples run over and sorted, and ship the fair grade in strictly closed packages and with the growers' brand on; others run the seconds, the smaller apples, and the rough apples, and occasionally wormy apples, into these rough packages with canvas tops and ship them, simply branding them either "seconds" or "ungraded" and without the grower's name. Now this section as read, so far as it goes, is all right, but isn't there a point where it is very misleading? The only designation on the package is the name and the size. I know one shipper in the eastern part of the State, and his advice to his commission merchant on these seconds with the burlap tops—he marks under them "huckster's stock." You know those hucksters buy them, empty them in bulk into their wagons and go around peddling them; that thought I give to the Committee for what it is worth. And one other thought—the motion that has been made, I feel that we can approve, however we may approve any of the sections here today, our Committee ought to be fully empowered to revise the bill and make such minor changes in the scope of the bill as they feel should be made.

Mr. Tyson: I think that is very wise and necessary.

Mr. Schwartz: May I ask Mr. Tyson how you arrive at the minimum size, how you grade the apples, $2\frac{3}{4}$ and $3\frac{1}{4}$ —how do you arrive at the minimum size?

Mr. Tyson: Do you mean, what constitutes the minimum size in any one apple?

Mr. Schwartz: In any one of those grades? Do you take the smallest apple you get in the $3\frac{1}{4}$ inch—is $3\frac{1}{4}$ inch supposed to be the smallest in that package and from there on up to $3\frac{1}{2}$? Will those go into that package, or will they go into the package from $2\frac{3}{4}$ or 3 to $3\frac{1}{4}$ inch? Which apples do you put in the same package?

Mr. Tyson: This law does not attempt to make it necessary to size the apples in quarter inch sizes; that is left entirely to the grower; if he thinks it is wise to do that, he may do so, but it is entirely possible for us to follow the old method of taking out everything under $2\frac{1}{2}$ inches and packing everything above $2\frac{1}{2}$ inch, but marking the minimum size $2\frac{1}{2}$ inches on the package. If we choose, in addition, to further size our apples into quarter inch variations, then we can mark the size of the smallest apples in the package, which is of course the minimum size.

Mr. Schwartz: When you take the $2\frac{3}{4}$ and 3 inch do you put them in the 3 inch grade?

Mr. Tyson: No, we mark them with the size of the smallest apples in the package.

Mr. Schwartz: When you brand 3 inch then, you have from 3 inch to $3\frac{1}{4}$ inch?

Mr. Tyson: 3 inch and up but none smaller than 3 inches.

Mr. Schwartz: If you grade them every quarter inch, then you have 3 inch apples up to $3\frac{1}{4}$ that would be called 3 inch apples?

Mr. Tyson: Yes.

Mr. Gibson: It strikes me that some people must have a wrong idea of that provision; it simply means that if your apples are packed $2\frac{1}{4}$ inch and up, you are required to put on the minimum size; it does not mean that you are required to grade them as to size and if they are packed $2\frac{1}{2}$ inches and up, the marking must be $2\frac{1}{2}$ inches. If the smallest apple you are packing in that package is $2\frac{3}{4}$ inches, it simply requires that the words "minimum size $2\frac{3}{4}$ inches" must be put there. In view of the lengths that some of these surrounding states are going to—New York State made almost a complete classification, and Maryland—Virginia has a law under consideration, and West Virginia is considering one, where they are going into it very completely. This is the minimum requirement of all these bills, and many more of them go so much further, that it strikes me that there ought not to be any serious question as to the advisability of Pennsylvania at least being willing to go this far. Our apples are going to be in competition with all these others, and I think those who have the best interests of the industry at heart, want Pennsylvania to be in the class with the best commercial states, so far as our condition will permit, and as fast as it is wise. It struck me that this was the very limit of a first step.

Mr. Tyson: I feel like making a suggestion at this time, and I will make it in the form of a motion. We have with us a gentleman representing the other side of the deal, the apple handler

and commission merchant, Mr. E. T. Butterworth, of the Philadelphia Boosters' Club; also representing the Philadelphia Branch of the National League of Commission Merchants. I understand he is here; I would like to move that he be given the privilege of the floor and asked to join us in the discussion of this measure.

The Chairman: We will ask him to do that without a motion. Mr. Butterworth.

Mr. Butterworth: I don't know that I have anything very much to say in regard to this bill except that, as it stands, it is an almighty mild measure. I have been firmly contending, for a long while, that what we need in this country is national legislation on apple packing. If legislation or rules have been satisfactorily adopted in the great Northwest to cover all the different sections out there, and to make their grading almost a uniform proposition, I see no reason why that cannot be done for the entire United States with the necessary sizing rules, color regulations, etc. However, that no doubt, is far in the future; as far as this proposed bill is concerned, I see nothing in it that anyone could object to, except the fact that a man can put almost anything over under those grading rules and get away with it. For instance, as I said to my friend Mr. Tyson a few minutes ago, he could pack a barrel of his best $2\frac{1}{2}$ inch "York Imperials, Tyson Bros., Flora Dale, minimum size $2\frac{1}{2}$ inches;" and some other grower could pack a barrel of York Imperials, with every apple in the barrel imperfect, and mark it "York Imperials, minimum size $2\frac{1}{2}$ inches," and they would be the same, except that one barrel would have the name of Tyson Bros. on it and the other would not. As that law stands, it is absolutely harmless to any grower and no objection could be made to it, but I think it is a good foundation to build some good legislation upon.

A Member: Tyson Bros. could have their name on every package that has apples in it according to this bill, but if you have a bushel or two, I don't see why a man who has only a few bushels of apples should be compelled to have his name on the package; it looks to me like it might be a source of confusion to the dealer to have so many names. Where would he come in? I think it is a good thing to put your name on when you want to, but there might be a time when Tyson Bros. would not want to put their name on.

Mr. Butterworth: If I may presume to ask for the floor again, the question the gentleman touches on is brand reputation, which is purely an individual matter; the State has nothing to do with brand reputation, but only standards of grades, and this bill does not provide any standards of grades or impose any restrictions on the maker. The reason I mentioned this bill as being particularly mild and harmless, is that most of this legislation is aimed primarily to prevent the packing of a lot of imperfect stuff, to be put on the market under practically the same marking as the finest grade stuff that comes in; this bill will not prevent that,

but I believe it is a good foundation for future legislation that will prevent it and possibly will hasten the time when all legislation, all over the country, can be made uniform.

Mr. Tyson: I think the Committee has fully recognized the fact which I tried to bring out a little while ago, that the bill, as proposed, was entirely harmless, that the provisions were such as any of us ought to be able to get behind. There are some people concerned in getting up this legislation, who have had sufficient faith in human nature to feel that it was something more than a foundation for future legislation; there have been some of us who have sufficient faith in human nature, and we felt that the requirement that a man put his name and address on the package would go a long way towards correcting a lot of evils. While we recognize the fact that there are undoubtedly some people who have no more pride in their name than to send it forth backed up by a lot of crooked work, we also recognize that these are the same people who probably would try to get around any law that we pass, and we do feel that this provision will go a long way toward correcting a lot of the trouble. We feel that this is really one of the most important things in the bill.

A Member: For one thing we should recognize the fact that a good many of the small orchards do not have a grading machine. There is nothing said in that law in regard to where a man packs by hand, if $2\frac{1}{4}$ is his minimum size, he will get in an odd apple or two that is below $2\frac{1}{4}$. It seems to me there should be an allowance made there of 2 or 3 per cent.

Mr. Tyson: We seem to have omitted, in this copy, a provision we had in mind allowing a 5% tolerance in the matter of size. That is a provision which we considered, and I thought we had it here, but I have just realized that we did not.

Mr. Gibson: In this same connection, it might be pointed out that the enforcement of this whole bill rests with the Department of Agriculture, and any department that had to do with the bill would undoubtedly recognize that its enforcement was about 90% educational and 10% inspection and detective work; so that, judging by the information that we have been able to gather from these other states where they have these more complete laws, that has been their attitude; no man has been prosecuted if it was apparent that he simply made a mistake, or was not familiar enough with the reading of the law or the matter of packing, and absolutely new to the requirements. It is only the case where it was absolutely undoubted that there was a flagrant attempt to evade the law, that they have prosecuted. I do not believe that anyone need fear that the law is going to be harshly administered.

Mr. Tyson: I would like to ask the permission of those who made this motion and offered the second, that 5% tolerance in the matter of size be added to this section.

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The Chairman: I couldn't see any objection to any part of this until you add that to it. It seems to me as though it is a very foolish thing to do. If we are going to mark them at all, mark them for what they are. I would not favor putting any tolerance into it, because, without any tolerance, you are liable to step below, and with a 5% tolerance, you go 10%. If you have some apples under $2\frac{1}{2}$, mark them $2\frac{1}{4}$; if there's one or two or half a dozen, there isn't any objection to marking them a little lower; there's lots of people who want those smaller sized apples, but the idea is to get the identity of who is responsible for that. Where a man packs a barrel of apples and is crooked all the way through, he ought to be responsible for it, and if I was in favor of this bill at all, which I do not say I am, I certainly would oppose any tolerance.

Mr. Kessler: Of course if the enforcement is going to be as moderate as our brother has said, it might work out, but as a matter of fact, the man who conscientiously tries to put inside of his barrel just what he marks on the outside, and accidentally slips a few through in various mechanical faults, would be liable under the law. It seems to me that a reasonable tolerance ought to be permissible and it ought to be so stated, because the great majority of the shippers in Pennsylvania are not of such size that they can afford to have mechanical graders, and a man does not want to put $2\frac{1}{4}$ inch minimum on what is practically $2\frac{1}{2}$ inches for fear his eye may have deceived him and he may have put 4 or 5 apples in the barrel which drop under $2\frac{1}{2}$ inch minimum. As I say, if you are perfectly sure that the law is going to be tolerant in its enforcement, it might be wise to leave that out, but if we are not going to be sure of that, I think that the provision which Mr. Tyson suggests ought to be there.

The Chairman: I sometimes get tired of this talk of conscientiousness in packing a barrel of apples. As fruit growers, we ought to admit that we spend more time in getting that little apple down in the middle of the barrel than it is worth; we can throw it away with less loss than we can spend the time getting it down in the middle of the barrel.

Mr. Creasy: If we have a law, we ought to live up to the law. I still believe that there are lots of apples that are grown that will find a market, and somebody must grow this cheap stuff; it would seem to me that it would be absolutely fair in this law to make an exception to those who mark their fruit "ungraded." I know it would mean a great deal to this early apple business in our section, where we live close to the hard-coal fields. I really believe that would be the right thing to do. When they are marked "graded," let's live up to the law. There is another proposition that comes in—we allow the manufacturer his anti-dumping clause in trying to arrange for him to dump his stuff over in Europe—but the apple grower has no chance to get shut of some of his stuff that he either has to give those people who are always clamoring for cheap stuff, or let it rot in the field. It seems to me that if we had an exception that this be marked "ungraded," that would meet

the whole thing, and when it is graded, I think if we have a law, it ought to be enforced; if stuff is graded, it ought to be up to the grade; that is my theory of it, but I believe we ought to have a chance. About the State of New York—I think they are dumping ungraded stuff down in our market that don't go under those grades; that is what I think they are doing. I think there ought to be some chance to have this ungraded stuff get to the market without coming under some law, while the other fellow, who is our competitor, does not come under the law.

Dr. Stewart: In the first place, all of the fruit under this law is ungraded; there are no grades established under it, so there would be no object in marking part of it ungraded, when it is all ungraded; we are not establishing grades; the only thing we are calling for is the name of the grower, the name of the variety and the minimum size. In those states which have established grades, we demand a minimum size statement on their ungraded class.

Mr. Chase: The question of the size I think is not very material, but I am heartily in favor of the provision for a 5% tolerance as suggested. I have had a little experience in employing hand sorters, on whose sorting table is the slogan "When in doubt, throw it out." If they were trying to grade a $2\frac{1}{2}$ inch size, the instruction was "Spend no time putting it into the measuring slot; if there is any question of its being $2\frac{1}{2}$ inches, put it into the smaller grade;" but in spite of all that, I do not believe there is a man living that can sort a grade of $2\frac{1}{2}$ inch apples without getting a certain percentage in there that are a little less than $2\frac{1}{2}$ inches. If there is such a man, I want him.

Mr. F. E. Griest: I agree with the last speaker that there must be some tolerance in the matter of size, in hand packing. I think it is a practical impossibility to try to pack $2\frac{1}{2}$ inch apples and not have a few of them, possibly a very few, that will be perhaps $2\frac{3}{8}$. That will be just about the limit, and possibly a shade one way or the other; and more than that, with the best grading machines we know of at present, I would not like to risk a \$50.00 fine on one or two undersize apples in a barrel slipping through. A little further, in reply to Mr. Creasy's remarks about the cheap apples packed in burlap covered barrels—it seems to me that when those apples are run in the barrel, even if they are run in just as they are picked off the tree, without a single one being taken out, if he wants to mark them minimum size 1 inch or $\frac{1}{2}$ an inch, it would come within the Act. As a matter of fact, the summer apples of almost any variety I know of, except crab-apples, would not run below an inch and not many of them below 2 inches. It seems to me that it would be a very simple matter and not add more than a cent or two a barrel to the expense of packing, to take out apples under $1\frac{1}{2}$ inches or $1\frac{3}{4}$ inches or 2 inches and so mark them.

Mr. Butterworth: I do not think that any provision for fruit graded as to size should be made so that you simply leave a loop-hole of this sort. It means that the grower of this summer

fruit which is packed up, probably half of it wormy, bruised, etc., can face a barrel off with $3\frac{1}{4}$ inch apples and get by with it, without marking the minimum size. The customer naturally takes it for granted that the face is somewhere near the contents of the package. I may have stuff down to $1\frac{1}{2}$ inches in it under that plan, but if the man who packed is compelled to market $1\frac{1}{2}$ inch minimum, the buyer wants to see what is in the barrel right away, and that is the right spirit. As far as this question of 5% tolerance is concerned, I agree heartily with you, Mr. Lewis, that it is human nature, if you are figuring on a certain amount of leeway, to take more; nothing truer was ever said than your statement that with a 5% provision for defective or undersized apples, you would have 10%. I would be in favor of a 5% tolerance, but not in the bill, because they will allow the fellow 5% anyhow; give the bill to the public, as a bill for the absolute grading of apples to a certain size, and let the Department of Agriculture use a 5% tolerance in administering the bill.

The Chairman: Mr. Butterworth, what would be the difference in price on the Philadelphia market between a $2\frac{1}{4}$ inch and a $2\frac{1}{2}$ inch apple?

Mr. Butterworth: That is a hard question to answer; you might as well ask the question—what would be the difference in price between $2\frac{1}{2}$ inch apples? You may have a barrel of New York State graded fruit, very fine Baldwins that will be worth \$5.20, and alongside of it another barrel of $2\frac{1}{2}$ inch graded Baldwins, E G grade, that will sell for \$2.50.

The Chairman: I meant to ask whether there was any real difference, under this method of grading, between the $2\frac{1}{4}$ inch and the $2\frac{1}{2}$ inch apples? What difference would it make in the price of the barrel if $2\frac{1}{4}$ inch or $2\frac{1}{2}$ inch was marked on the barrel?

Mr. Butterworth: That would depend entirely on the proportion of apples running $2\frac{1}{2}$ and the proportion running $2\frac{1}{4}$; if the proportion was considerable, the difference would be about 50 cents a barrel as the market is now; if you had a very small proportion, there would be practically no difference.

Mr. Chase: I wish to move to amend the report and authorize the Committee to include the proposed 5% tolerance.

A Member: I would like to ask if this bill is supposed to include the fruit brought in by farmers in open packages, etc.?

The Chairman: No, sir.

A Member: The object of fruit growers' meetings, as I understand it, is to help fruit growing in Pennsylvania, and usually we have some system whereby we can prevent the dumping of this poor material on the market; if we cannot do that, we are not going to be able to improve it very much. This is a very mild bill, it does not say anything about wormy apples or color. I am sorry those things are not included, but it does say something about the man's name and I believe that is the best part about the bill, that the man's name must go on the fruit so that the consumer can see

who put up the package and if he wants another package of that kind, he can go to the grower and buy it. As Mr. Stewart has said, the fruit is practically all ungraded, and therefore I will withdraw my objection on that part and hope the bill will pass as it stands.

A Member: I agree with all of you about living up to what you believe. We have a great many bills on our statute books today, there is no question about that, but if there is not some allowance put in that bill for the man who is packing by hand, you cannot live up to that bill and won't do it, make up your mind to that fact; if there is not some tolerance, you won't live up to it, so what is the use of putting it in?

Mr. Creasy: I move that the bill be amended so as to have inserted in it that those who have the right to enforce the law make allowance for tolerances, and I don't know that we ought to mention 5%, because I think there would be a different tolerance in packing Jonathans from Baldwins, because the Jonathan as a rule runs smaller than the Baldwin, and I think if you left that to the Board with a proviso in the Act that they should make some rules for tolerances, they would allow 5%.

Amendment seconded.

Mr. Gibson: In connection with the point Mr. Creasy raised, the bill has a provision in it for the promulgation of rules and regulations by the Department at Harrisburg, and personally I am inclined to feel as the President does in regard to the matter of making any mention of any per cent. I think that the fact that in practically all the enforcements of our various food inspection and fertilizer inspection laws, the Executive officials do not publish it, but I think, as a matter of fact, they do exercise that very practice; if it is just below, they have a certain tolerance, and if it is below that tolerance, why they will bring in prosecution, and I think it would be perfectly safe to leave the enforcement of the Act to them.

Mr. Gates: I cannot see the object of allowing a 5% leeway. If a man put his name on the barrel, wouldn't it be a whole lot better for him, in the eyes of the consumer, if those apples were all a little larger than 2½ inches rather than a little smaller?

Mr. Chase: With the consent of the seconder, I will withdraw my motion to amend by allowing 5% tolerance.

Mr. Creasy: I offer mine as a substitute, for this reason, that under the decision of the Supreme Court on an insurance policy, it was ruled that the legislature had no right to delegate those powers. This Commission will have a right to make rules, but when we say that the size shall be so much and no less, I do not think they will have a right to do that unless you make some mention in the bill that they have a right to allow tolerances.

Mr. Tyson: That is exactly the view that the Committee took in suggesting this tolerance. We thought it might be better, in the bill, to make strict regulations and allow a small tolerance

rather than leave it to be fixed by rules that might be made by the Secretary of Agriculture, for we recognized the fact that Mr. Creasy has brought out, that the Secretary of Agriculture is a changeable body, and we do not know at all what rules a future Secretary of Agriculture might see fit to institute; and if we left this matter unsettled in the bill, a future Secretary of Agriculture might make that tolerance 10% or 15%, or anything he saw fit, and we thought that the only wise way was to fix the tolerance in the bill as small as we felt safe to fix it.

Mr. Jackson: I think that is exactly right, to have a small percentage on there. I have only a small orchard and cannot afford a grader at the present time; I tell my packers to put in nothing smaller than a 2½ inch apple, but I tell you I haven't been able to get the packers to do it. I stand right beside them, I have emptied them in the barrel myself, but there is an apple goes in now and then that you can't help; I haven't found the hired help that can do it, and I do not want to be exposed to a \$50.00 fine when the rules are that way and I can't help it.

The Chairman: You have a certain standard to pack by; you have to work up to it; suppose you lower that standard 5%, and then you have the 5% to work up to just the same; it doesn't make a bit of difference as far as your getting it right or wrong is concerned, whether it is fixed at a certain standard or 5% below that. You can just as well get up to a certain standard as to a little lower standard, it is the same thing.

Mr. Tyson: The difference, Mr. Lewis, is this; if we fix a standard and fall below that standard we break the law, and are liable to a fine. This 5% allows us just that opportunity for mechanical errors which I don't see how to avoid. If we get beyond that 5%, then we are liable.

Dr. Stewart: This 5% allowance is only one apple in 20 that may fall below, and it seems to me that it would be better to make that little allowance or tolerance, to provide for these mechanical errors which Mr. Jackson has just named, and thus prevent the possibility of a variable tolerance which is indicated by the last amendment that has been made. I therefore re-move that we permit an amendment to this section, which will provide that a tolerance not to exceed 5%, be allowed.

A Member: The gentleman seemed to think that 5% was quite a number of apples in the barrel; it is a big difference whether it is 5% on every apple in the barrel, or 5% on the number of the apples in the barrel; which would that mean? That is the point Mr. Butterworth made a few minutes ago on the price of apples.

Dr. Stewart: This means that there cannot be over 5% of the number of apples in the barrel fall below the minimum stated. It would be impossible to have all the apples 5% below, because then you would not have a minimum at all.

A Member: I would second the motion of Prof. Stewart. I think the man who tries to take his 5% should get his \$50.00.

Mr. Hertzell: I would like to say this, that in order to give the confidence that they are going to be able to pack under it to your growers, and also to make allowance for the man who is packing his apples by means of hand grading as compared with the man who has a mechanical grader, that such a strong tolerance as you have designated here, would be very advisable. It is impossible to hand grade and hold up to a definite size and do it in a commercial, practical way; 17 apples in an ordinary barrel of 350 would be all that a 5% tolerance would allow, so there is considerable argument to raise that tolerance, rather than leave it out. I should say that would be a very good amendment.

The Chairman: The amendment to the original motion has been regularly made and seconded. All in favor of that amendment offered by Mr. Stewart, will signify by saying "Aye." Opposed, "No."

The amendment was carried, and the original section as amended was then adopted.

The Chairman: We will now proceed with the second article.

Mr. Tyson: I notice on the program that Mr. F. E. Griest is asked to give the views of the Adams County Association on this matter, and having been in conference with him I know that he has, from the Adams County Association, some suggestions that might properly come in at this point, considering the fact that we have already acted on the meat of the bill. With your permission I would be glad to call on him.

Mr. Griest: I am glad to come before you this morning, for while I have been a member, in fact a life member for a good many years, this is the first time I have ever attended a Pennsylvania meeting. Two years ago when the apple grading bill was introduced into the legislature, the Adams County people, as well as the Legislative Committee and others of this Association, were interested in it and rather interested in seeing it defeated, for several reasons. One of them was that it was rather an untried bill; in fact, the bill that was introduced in Pennsylvania was a copy of the original New York bill which had been in effect for two years and was, even then, in the throes of amendment. We thought it was inadvisable because the apple industry, or at least the commercial apple industry in Pennsylvania is rather an infant; in New York, it is an old established work, and we did not want to try to strangle the infant with any allopathic doses of regulation. I am very glad to say that the bill was not passed two years ago. There were one or two other provisions in that bill which seemed inadvisable; the grades did not seem to fall into the natural grades that we are packing our apples into. Some of us were at the Rochester convention this year of the New York State Fruit Growers Association, and listened with considerable interest to the discussion there. You all know that New York has had a very poor apple year so far as perfect apples are concerned. They had a wet season, very favorable for scab, and as a result, probably in some counties 90% of their apples were so scabby that they could not be packed

into the fancy A or B grades. That naturally led to a great deal of dissatisfaction. It was rather a hardship for a man who has been accustomed to packing his best apples in A grade, to find that he did not have any best apples. That is neither here or there, he did not have them and so he could not pack them, but what seemed to be the need, was for the opening up of a B grade, to take care of the bulk of the apples which did not have any defects that would cause material waste; that is, there are a good many of the scabby apples that may be only slightly defective, which would be just as good for cooking as a fancy apple, but they had to be packed and graded. In New York, there were also present the Commissioner of the Dominion of Canada, Commissioner of Agriculture, and also Mr. Lupton, of Virginia, who took part in the discussion. The Canadian law I think, in effect, is the most drastic that is yet in effect, but that also has been a gradual growth, starting out with light requirements, several years later more requirements being added and several years later, still more; and Mr. Johnson told me that what he considered the most valuable clause in that law was the clause relating to honest facing, that the face should not give a false representation of the contents of the barrel. Now, to come down to the present time; in our Adams County meeting last December, this act was brought up and the probability of a law or a bill being entered in this legislature was considered; a committee was appointed to think it over, gather all the information they could and present it to our January meeting, and after our January meeting, which was about two weeks ago, I was very kindly informed that our friend Mr. Tyson wanted me to present our conclusions to this meeting. We agree entirely with the first section of the proposed bill as read by Mr. Tyson; in fact, they are practically identical. On the other hand, we think that the apple industry of Pennsylvania is in need of a little uplift, and we thought that the name and address of the packer and the minimum size would hardly be going far enough. Now, there are several classes of men who put up what you might call a dishonest pack. There are some that don't know, and there are some who do know how to put it up but are careless, and there are others who are wilfully dishonest. Now, under those who don't know, you might put those who think they know, but it is just a matter of judgment as to what is a defect or just what is a 2½ inch apple or something of that kind. Now, the name and address of the packer, would probably work well. Last night, in our committee meeting, I said it would probably prevent one-third of the dishonest packers from putting up a poor pack. Mr. Tyson said he had a good deal more faith in human nature than that; he thought it ought to be a good deal larger than that. Well, that is just a difference of opinion, so, at our meeting, we decided to go a little bit further and recommend an additional clause which would read something like this; "The face or exposed surface of any closed package of apples shall not give a false representation of the contents of the package, and it shall be considered a false representation when more than 15% of such fruit is substantially smaller than the face or is inferior to the face in freedom from

defects and blemishes." Now, that may seem revolutionary, in fact it is to a good many of us, but we thought it was worth while. The possible objections, just from a commercial standpoint, are the old story, as Mr. Hetzell said, of the fact that when you are packing a good many apples, the barrels are packed quite in advance of filling them, that is, you have one set of men facing and when they face the barrel, they do not know just exactly what fruit is going in there; that is, it may be all under the same pack, but in packing commercially, you cannot pick out just what run of fruit is going in a barrel; that is, there may be some that will run fancy and some that will be poor in color, or it may be several crates or several baskets that you are putting on your packing table are from the under limbs of the trees and they come all together; that is just from the commercial packing standpoint. Another possible objection is that in the matter of size, that the best colored apples are usually the big apples, that is the apples that grew on the tops of the trees, in the top limbs and on the ends of the branches, are generally not only the bigger ones but are also the better colored ones. Another thing is that it is very possible to injure the sale of barreled apples by detracting from the appearance of their face. Possibly when it comes to reselling, that would not have any effect, but I am talking about the wholesale part of it. We ship a carload of apples to Philadelphia or New York to a commission merchant, or to the New York auction; the first impression that the buyer gets when those apples are opened goes a long way towards making up the price he is willing to give for them. If he gets a flash of nice color when that barrel is opened, it takes several defects in the barrel to counteract it. Now, while there is nothing in this clause, as we read it, there is nothing said about not putting the colored apples on the face, that was a point considerably discussed. It seems to me that it is natural in any proposition, it is a general practice in any selling proposition, whether it is apples or any other fruit, or whether it is a grocery store or whether it is a drygoods store or a men's furnishing store or whatever it is, to make an attractive appearance. A retail store right here in Harrisburg, which has an unattractive show window will not get nearly so much trade as one which has a very dainty, attractive, bright display in their show windows. Now, that seems to me to apply also more or less to the face of barreled apples. There may be some difference in the quality between colored apples and apples that are not colored, but the difference is largely one of the eye, and as Dr. Fletcher said last night, we eat with our eyes, anyway, instead of with our mouth. But if the apples inside the barrel are approximately the same size, that is, if there is no substantial difference from the face, and if there is practically the same freedom from defects as the face, it seemed to us in Adams County that it would give a wonderfully increased confidence to all buyers and consumers of Pennsylvania apples, and at the same time, it would not work any considerable hardship on either the commercial growers or on the smaller farm orchards which may pack only a few apples to ship for sale. Now, as I understand it, that would not apply to closed packages of the

burlap barrel, or hamper type, because they are practically not faced. Is that correct, Mr. Creasy?

Mr. Creasy: Yes sir.

Mr. Griest: Do you make any attempt at facing those?

Mr. Creasy: No sir, put them in just as they come from the tree, so that a man can see just what he is buying.

Mr. Butterworth: That applies to the hamper, to the new, open bottom hamper which promises to come into much more general use in the future.

Mr. Griest: That certainly would apply to that type which has the removable bottom, where you face the hamper and pack it and then nail in the bottom; that would be the same as a barrel because it is faced. There may be some other points I have not brought up, and I do not offer even this as by any means perfect, not even the idea, because there is a chance for a different wording and it may be advisable even if the general idea was adopted, to make a difference in the requirements as to size. Now, as I read that—as we adopted it over in Adams County—there was to be not more than 15% of the apples smaller in size than the face apples. That really seems to me to be more drastic than we intended. I do not know whether it is the Virginia law, or whether it was an interpretation of a law of some other state which has a provision practically the same as this, in which they provide that the barrel which has larger apples than the face shall offset the smaller apples; that is, if you are packing apples 2½ inch up, say, you face the barrel with 2¾ to 3 inch apples, if you have some 3¼ or 3½ inch apples in the barrel, that increases your allowance for 2½ and 2¾, which means that the face shall be practically about 15% better than the average apples under it. I think that is all; that outlines our Adams County idea. I thank you for your attention. (Applause.)

The Chairman: Is there any discussion of what the Adams County people have brought to us? If not, we will proceed with the reading of the second article of the recommendations of the committee.

Mr. Tyson: I think we ought to act on that suggestion, either accept it or turn it down, at this point.

A Member: To bring it before the house, I move that it be incorporated in the act.

A Member: Wouldn't it be well to have that act that they wish to discuss, read again, so that it will be a little fresher in our minds, and if they wish to discuss it, they will understand it better?

A Member: I would move that that be incorporated. Motion seconded.

The Chairman: That practically means that that takes the place of the first article.

Mr. Tyson: No, it means that that is in addition to it.

Mr. Griest: If I may say another word; even the Adams County Association was not unanimous in this and we are not even yet absolutely sure that it is the right thing, but we are glad to have it before the meeting and hear all the discussion possible, pro and con.

Mr. Heilman: It seems to me that the object of any regulation for the sale of apples and grading is that our apples may have some reputation, and unless we have some designation whereby we are compelled to keep up to some standard, it seems to me that any legislation along this line would be useless, and therefore I am very much in favor of this clause making the face of the package—I would prefer even making it stronger than the Adams County people have made it—making it 5% of the face and not less than the contents of the package. I think this is a highly important section and that we ought by all means to include it in this act.

Mr. Myers: I heartily agree with the Adams County Association as far as they have acted upon this, and it seems to me that there is one important feature lacking in this proposition, and that is color. If we are going to let a leeway of 15% stand, why not let us put color in that? There is nothing said in there about color, it just refers to size, etc., so I would move to amend by adding the word color.

A Member: I think that if that is considered carefully, you will find that there is plenty of leeway there for color; there is no mention made of color in regard to facing the barrel, it is simply in regard to size and other defects. A man may put his green apples on the face if he wishes to, or the highest colored apples, as that read and as the Adams County Association adopted it, there was no objection to putting color there, simply in regard to size and other defects.

Mr. Myers: I disagree with the gentleman that has just spoken and think that an apple that should be red is not good unless it is red. If we put red ones on top and green ones in the middle, we are deceiving the buyer far more than if we put small ones in. I would rather have a good little red apple than a big green apple which should be red but is not, because it is not good. I believe I have had someone work for me who said they would rather have an apple not too red in color, but they are the only ones I ever met who thought that way. I believe that color ought to go into this, I think it goes a long way toward making the package uniform and standard.

Mr. Heilman: Doesn't the fact that the face should be a fair representative of the contents of the package, imply color and every other condition?

Mr. Butterworth: Am I imposing on the good nature of this meeting by getting up again?

The Chairman: No, we will be glad to hear you.

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Mr. Butterworth: I agree with both the gentlemen who have just spoken, in this, that I fail to see how it is any more dishonest to face a barrel with larger apples than with apples of a better color. There is another point here which I think ought to be brought out, and I want to say, in the first place, that I am emphatically in favor of honest packing; don't let anything I say before this meeting make you think otherwise, but this 15% provision that Mr. Griest has just brought out in his proposed amendment to this bill, if you realize just what that means, it means absolute grading to size or else selling your bigger apples under the face of your smallest. What it means is this; you know the old-fashioned method of packing two grades, No. 1 and No. 2; No. 2 from say 2 to 2½ inch, No. 1 from 2½ inch up. Under this provision that is before you, you would be absolutely prohibited, unless you faced your 2½ inch pack with apples approximately 2½ inches in size. I do not believe there is a man in the County who will put 3 inch and 3½ inch apples under 2½ inch apples in the face; the effect of this bill will be to force the smaller orchardist, who has no machine graders, instead of packing just two grades, to pack several grades; it is going to force him to grade absolutely to size, if he wants to get a fair deal on the market. You will get a big bunch of small growers in the State of Pennsylvania who will oppose the passage of any legislation, unless you are careful. You must also take care of the non-commercial orchard, because the non-commercial orchardist all over the country wields an enormous influence and will block anything in the legislature that is against his interests. You, in this convention, represent more commercial than non-commercial growers.

Mr. Gibson: The Committee of this Association felt inclined to coincide with the recommendation of the Adams County Association up to this point; in regard to the matter of facing, we felt that it should be referred to the Association for general discussion; we realized these very points, and it is certainly a commendable effort, but we realized that possibly the chief objection would be the fact that it would endanger opposition on the part of small growers who might become opposed to the whole scheme, and act to prevent further reasonable advances in the future. I think that the committee wanted the matter clearly understood and discussed by the Association.

Dr. Stewart: I do not know whether we should pass this provision or not, but it seems to me that if we do pass it, it should not be passed in its present form. You see in the first place that this provision simply calls for the face being a fair representation of the balance of the pack; then it goes on to define what a fair representation is, by saying that no more than 15% of the fruit in that pack shall be below the face in either size or freedom from blemish; that puts the face down in the lower 85%, and it means that you have to have 85% of your fruit in the barrel either equal to or above the face. That does not make the face a fair representation of the pack. If this thing is going through at all as to the face being a fair representation of the pack, the thing should be entirely

re-worded to determine when it is a fair representation, and I would suggest this wording for it, merely working it in in the proper fashion, that the face shall not excel the average in the pack by more than 10% in size or freedom from blemish. That would permit the face to be somewhere between 50 and 60 per cent; it shall not excel the average of the pack by more than 10% in size or freedom from blemish. If you want to put in size, color or freedom from blemish, you can do so, but in my opinion you'd better omit color at the present time, because of the fact that the general practice in the market is to face apples in an attractive way, and if you put fruit up that does not take that fact into consideration, no matter how good it is through the balance of the barrel, that fruit is likely to suffer.

Mr. Grove: As I understand percentages, the recommendation of Mr. Griest in trying to inject into this a reasonable degree of honesty in packing, and trying to express honesty in percentages is a pretty hard proposition, but as I understand the proposition of Dr. Stewart, it would permit of, seemingly to me, a great amount of dishonesty. Now, I may be wrong, and if I am, I want to get straightened out. The proposition presented by Mr. Griest is that the barrel of apples, except color, will permit 15% better apples on the face than in the barrel. The proposition of Dr. Stewart is that you strike the average of the barrel and add 10%. Now, I can conceive that in packing a barrel of apples under the first proposition, that we must have, I presume, $2\frac{1}{2}$ inch apples or any size you choose to pack, but that would not permit of more than, in a general way, $2\frac{3}{4}$ inch apples being used on the face. Then, in the matter of defects, worms, scab or what not, 15% difference without reference to color. On the other proposition, we can take a barrel of apples of any conceivable kind above $2\frac{1}{2}$, put practically all the large ones on the face and conform to 10% above the average. My mathematics may not be right, but that is the way I view the thing. Now, one other word, I believe with Mr. Myers in the matter of color, but under the present commercial conditions, wouldn't it be too radical to remove color from the face? Isn't it the practice in the sale of apples to expose the face, and isn't the color the first thing a buyer wants to see, and if so, isn't it too radical to propose to change the practice of selling on color? Isn't it a fact that the apple sells on its color and isn't it too radical to withdraw that at this time?

Mr. Chase: The morning is running away, and in order to bring this thing to a head, I move that the amendment to the original resolution as proposed by Mr. Griest be laid upon the table.

The Chairman: The amendment was not seconded, that I heard.

A Member: I second the amendment.

Mr. Chase: If it isn't seconded all this discussion is entirely out of order.

The Chairman: It has been seconded.

Mr. Chase: Very well, I insist on my motion that the proposed amendment be laid on the table; let's get a vote on it one way or the other.

The Chairman: There was a motion by Mr. Grove to accept the recommendation of the Adams County Association, then an amendment was offered by Mr. Myers to add something in regard to color; I don't believe that amendment was seconded.

A Member: Mr. Groves' was.

The Chairman: Was your amendment seconded, Mr. Myers?

A Member: Might I say a word? I would like to second Mr. Myers' motion. I hesitate to make any remarks on the report of the committee because I was not present at the previous session. I know they have given a great deal more study to the subject than I, as a small commercial grower, can possibly do, but it does seem to me that, nothing ventured nothing gained, and while we may expect considerable opposition to any grading law we introduce in the legislature, it seems to me that it is a great mistake not to ask more rather than less than the one already proposed, and I am especially in favor of a reasonable color provision. Some of us who grow Northern Spys as a specialty, I think pretty generally recognize that an undercolored Spy is generally an underflavored Spy; I think I might say almost invariably that it has not the quality of a well-colored Spy, and while I may seem to be acting against my own profits in advocating color, because I have not always succeeded in raising Spys that are of good color, I do feel that it would be a great help to me, as a grower, to have a standard of color as well as a standard of size and of physical defects like scab and wormy fruit. It does not seem to me that the legislature, if it is willing to approve of a minimum standard and also such a provision as the Adams County Association advocates, of having the face of the barrel represent fairly the contents of the barrel with only a small allowance for variation, that they are at all likely to object to a reasonable standard of color, and I hope therefore that we will add that provision, and therefore I second Mr. Myers' motion.

Mr. Chase: I do not wish to shut off any of this flow of eloquence, but we have before us, as I understand it, a proposed amendment and then Mr. Myers' amendment, which would be construed as an amendment to the proposed amendment, assuming that is right and in order, and I would move that both the amendment and the amendment to the amendment be laid upon the table, and I call for the question; the motion is not debatable; a motion to lay on the table is not debatable.

Motion seconded.

The Chairman: Are you ready for the question? A motion has been made and seconded to lay both the amendment to the original passage and the amendment to that amendment on the table.

Mr. Griest: That means practically to drop the question of the facing proposition for the time being.

Mr. Wertz: I am not in favor of Mr. Chase's motion, namely to lay both those amendments on the table. I am not in favor of the amendment to the amendment adding color, I think it is a mistake, I believe we will be too radical to do that and will run against snags; I am in favor of the original amendment, namely, the one or something similar to it, excluding the word color, such as was added by the Adams County Fruit Growers Association. I grow apples for the money that is in them, and that is the reason for having the best ones on the face and the next best ones next to the face and the poorest in the middle of the barrel. I do that because it pays. I don't like to do it, only to a certain extent, I daren't do it too much because it would not pay; I would like to get away from it. As quickly as you pass a law and make me make the middle or balance of the barrel as good as the face, within 15%, I will be glad to have that law and then I will do it, but not before. I would like to make the face good, I believe it is the right thing to do, the first step should be the best, the first impression should be good, I would like to put even larger. I want to continue to pack only two grades, $2\frac{1}{4}$ to $2\frac{1}{2}$, and $2\frac{1}{2}$ and up, and if I have some 4 inch apples, I like to put them in that barrel; I would like to have the privilege of facing with some 4 inch apples and putting the small ones down in the middle and still keeping within the 15% limit. I do not believe in adding the word color, but I do believe that the entire barrel should be within 15% of the face.

Dr. Stewart: In order to make some progress on this, it seems to me that there are only two ways to do it; the first is to make a motion to determine whether or not this organization wishes that the face should be a fair representation of the balance of the pack. Then, if they wish that, we will be brought up to a discussion of what constitutes a fair representation of the pack. The statement as shown from Adams County does exactly what I stated before, it puts the face down to 85% from the top, as I can readily prove by calling for the exact wording of that statement. My statement puts the face somewhere between 50 and 60 per cent of the average of the pack. Now, it seems to me there are just two steps for us; one is to determine whether the people want to take action on this matter; the second is, how shall we describe what is a fair representation of the pack?

A Member: I am not a professional parliamentarian, but I would like to inquire whether such a motion as Mr. Chase made is not a privileged question, and ought not to come before this body immediately with debate?

Mr. Chase: I wish to say that my thought in making this motion was to clear the calendar, and pave the way for Mr. Stewart to submit his proposed amendment which could not be very well brought before us as a third amendment. That was my only object, to clear the way for Mr. Stewart's amendment.

Mr. Creasy: If you make that motion to lay those two amendments on the table, under all parliamentary rules, that carries the whole business on the table and you are done for; you cannot lay them on the table unless you lay the section on the table.

Mr. Chase: I withdraw my motion.

Mr. Tyson: I want to call your attention to one point which was before the committee having this matter in charge. I think that everyone on the committee agreed that something of this kind was exceedingly desirable, everyone on the committee thought that some time grades similar to those, if not exactly corresponding to those in other states, would be adopted. The committee was in serious doubt whether, at this time, it would be wise to put into this bill a clause of this kind, for very much the same reason that we were doubtful about putting in specified grades, namely that it would interfere, probably seriously interfere, with the passage of this foundation that we have laid. We were all united in the wish that that matter be brought before this Association for discussion, and I think that members of the committee would be delighted if the Association would see fit to add some such clause. I see the defects in the wording of the Adams County recommendation, and I think Prof. Stewart's wording might be better. The United States has a still different wording that does not put in any percentage. I just felt like giving you that reason why we have not put this "facing" clause in our report, and why we felt that it might not be wise to put it into the bill. If, looking fairly in the face of the matter, the Association feels that a bill can be put through with a clause so far-reaching and so drastic as this one is, as much as we hope for its passage, if you think that can be done and will stand back of it, your committee will be delighted. I just felt like putting it to you so that you can consider that feature of it fairly.

The Chairman: The motion to lay the resolution on the table has been withdrawn; the amendment to the amendment of Mr. Stewart in regard to the color is before you; all in favor will say Aye; opposed, No.

Motion lost.

The Chairman: Now we are back to the original amendment of the Adams County Association. You have heard that amendment; are you ready for the question.

Mr. Butterworth: I want to again reiterate what I said before, and that is the fact that this amendment, as it stands, proposed by the Adams County Fruit Growers Association, means that you cannot pack a barrel of apples $2\frac{1}{2}$ to 4 inches without facing it with $2\frac{1}{2}$ inch apples, not 4 inch apples. That is the purport of this amendment. It is an important thing, gentlemen; I hope you will give it a lot of thought before you vote on it.

Mr. Hertzell: I just want to emphasize the point Mr. Butterworth brought out; the provision as stated in the Adams County proposition is evidently taken from the wording as given in the

Canadian law; however, if you will analyze that, you will find that your face must represent the lowest 15% of the apples in your barrel. The intent was evidently not to mean that, but that is exactly what it says; in other words, that the apples on the face cannot be better than the worst 15% of the apples in your barrel, so far as size and defects are concerned. Now I just want to call your attention to one or two other things in regard to this. You certainly started out with a "Safety First" policy in not adopting any grades and standards and not going very far, but you have suddenly jumped to a consideration of something that is rather important and rather vital. The commercial practice is to face apples. You are considering a provision which makes you face them below the average even of those apples. Now, if you can have a facing requirement which says that you shall face them with the average apples in the barrel, you are putting a great deal more than they are in any of the other sections I know of, and that would certainly be enough. I believe that the difficulty has been, in this discussion, that we have not all understood the criticisms made. What Mr. Stewart and Mr. Butterworth are endeavoring to point out is, that the wording makes you face your apples with those 15% down below, but to simply state that the face shall fairly represent the contents of the barrel in so far as size, color and quality are concerned, would seem drastic enough.

Mr. Mason: In response to that suggestion about facing the barrel—your having to face the barrel with smaller apples than the rest of the contents—you have already approved the first section concerning the size, and if we face a barrel with larger apples than there were in the contents of the barrel, we would have 15 or 16%, you could put it, in the face—a whole per cent beyond your allowance in size—so you could not possibly face the barrel with larger apples than the rest of the contents. Concerning the reason for wanting the face to represent the contents of the package in everything except color—I do not think anybody could get up here and talk against honesty, and that certainly is one of the first steps in an honest pack. We will do more by coming out and saying that our face will represent the contents, we will do more towards getting an honest pack in that way than almost anything else we do, regardless of how we word it. It seems to me if we could pass this and put it up to the committee to word that correctly, that we will get down to business instead of wrangling over words, because it is a two or three hours job to figure this out in language; if we pass it in the present sense and refer it back to the committee for rewording, it seems to me we will get the results we all want.

A Member: It seems to me that the mathematics of this discussion is involving us, and if, instead of percentages, we would insist on the plain requirement that the face of the barrel be a fair representation of the contents, we would accomplish very satisfactory results; I would like to second the amendment of the gentleman on my right.

A Member: I believe Mr. Grove made the motion to accept Mr. Stewart's amendment, wouldn't it be well to vote on it in that way?

(Mr. Stewart's amendment was withdrawn.)

The Chairman: Now the calendar is wiped clean.

Dr. Stewart: I move this amendment subject to such changes in wording as may seem best to the committee; first, that the face shall fairly represent the contents of the barrel, and a fair representation shall consist in the fact that the face shall not excel the average of the pack by more than 10% in size or freedom from blemish. You can make that more than 15%, if you like.

Dr. Stewart's amendment was seconded and adopted without discussion.

Mr. Tyson: Now we understand that you have instructed your Legislative Committee to embody this face requirement in the bill, and it will be done in accordance with your instructions.

The Chairman: Now I think the next thing in order will be the reading of the second article of what they have brought before you.

The second, third and fourth articles were read and adopted without discussion, and the next article, in relation to penalties, was then read.

Mr. Tyson: This is rather an important article. I move the passage of that article.

Mr. Chase: I second that motion. In regard to the question of penalties, I recall that our former Governor Pennypacker stated, in my presence, once, that while he was Governor during two sessions of the Legislature, if all the bills that had been introduced had met with his approval, there would have been about 150 new crimes and misdemeanors established in this State. Now, as worded, "for each offense, \$50.00," every barrel would be an offense, wouldn't it? If a man shipped a carload of apples and every barrel or every box was found defective, each package would be an individual offense. I do not suppose that it is the intention of the committee that every man who might be honest but unfortunate in his grading and packing, that for every package that was sent out, which was defective, he should be charged \$50.00. I simply wanted to bring that out.

The article was then adopted without discussion and article 6 was then read and adopted without discussion; article 7 was read and Mr. Tyson moved that it be adopted. Motion seconded.

A Member: Does that mean that anyone putting up the pack, who didn't do the job right, you could hold on to that party for it, or just the man that ordered it done?

Mr. Tyson: Both are responsible under the law. It seemed pretty clearly to read that way; that is the regulation in other State laws.

Mr. Fox: How can you define a person as an Association? An Association seems to me to be a number of persons. You have a legal technicality there all the way through, saying that a person

shall mean a firm or corporation or association. Why not state "person or persons," and then go ahead with your corporations and put everything else in separately, not make one word stand for a whole lot?

Mr. E. C. Tyson: That is generally done under definitions, and I suppose this bill will do the same.

Mr. Fox: Well, it's bad form. That is why our lawyers have so much work to do, so much to quibble over.

Article 7 was then adopted and article 8 was read; moved and seconded that it be adopted.

Mr. Gibson: It just comes to me that it might be wise to add the words, "Shall be exclusively vested in the Department of Agriculture." It came to me in reading it over. That is the practice in other states—it is simply a question of whether that wording would give them the exclusive administration of it. I move to add the word "exclusively."

The Chairman: It seems to me that we can get the sense of this convention to the committee, and can safely leave it to the committee to make any little changes in the wording, without changing the real meaning of the act.

The article was then adopted and article 9 was then read; it was moved and seconded that it be adopted.

Mr. Creasy: It seems to me you ought to make that later; it ought to be the first of January or some other time.

Mr. Tyson: That question was considered; however, the first of July 1917 or 1918 might seem to be the wisest time, inasmuch as the apple trade of any one season begins somewhere near the first of July and runs over toward that time the next year; the law ought to go into effect at the beginning of one season.

Mr. Creasy: I move that 1918 be substituted for 1917. Motion was seconded.

Mr. Tyson: It seems to me that the kind of requirements we have offered here are such as we could get into operation in a pretty short time, and I don't really see any reason for postponing it for another whole year. However, I am entirely willing to leave that to the Association.

A Member: The only thing I see about postponing it until January is that it gives a chance to some of our friends to get rid of their apples.

A Member: If we are going to go into this matter at all, there is no reason to prolong the agony another full year; July 1917 may be a little short, but certainly July 1918 is as much too long. I am not in favor of that.

Mr. Creasy's motion was lost.

Mr. Gibson: I do believe that July is so near the close of the session of the legislature, that it is a question whether it might

not be too short to really get it into operation. I move that September 1st be substituted.

The motion was seconded and adopted, and the article as amended was then adopted.

Mr. Chase: Mr. Chairman, one thought occurred to me, whether the committee will consider that they are fully authorized to revise this bill. You, who have had experience in drawing acts of assembly, will know that when you come to get down to the final work, the general scope of the bill, the general thought will remain, yet many of the sections have to be practically redrafted. Furthermore, in the committee new thoughts will come up entirely in harmony with the scope of the bill which ought to be added, and if the committee are going to feel any hesitancy in going ahead and doing their full duty, they ought to be formally empowered so to do. I never hesitated to go ahead when I was on a committee.

A Member: Do you make that as a motion?

Mr. Chase: Yes, I so move, that the committee be fully authorized to revise and correct the bill in accordance with the sentiments expressed here this morning.

Motion was seconded and adopted.

The Chairman: Now, another matter that the Legislative Committee wanted to bring up at this time, is the matter of damage in this State from deer and elk; they report that this has been brought to their attention several times, and they would like to have some discussion, or some suggestions, or some questions asked by you people in regard to it. Has anybody anything to offer?

Mr. Creasy: In order to get it before the house, I move that this Association endorse the proposition of having the State pay the damages for deer and elk as long as they have the hunters' license in operation.

Motion seconded.

Mr. Chase: I speak now from experience. If an act along that line should be passed, unless there is a specific provision in an appropriation bill from which to pay for that damage, it will not be paid.

Mr. Gibson: The committee, in view of the experience brought to our attention, rather felt that it was in order for the Association here, as a matter of protection, to recommend the repeal of the Buck Law for a period of five years; that was what we intended to bring up here, and Mr. Tyson and I think the law for the payment of damages—I know it is a pretty difficult matter, in many instances, to collect the money, but the matter of funds ought to be very much easier now than ever before on account of the hunters' license tax. The game commissioner is supposed to have the authority to pay for damages.

Mr. Creasy: They don't have any money for that purpose.

Mr. Gibson: They have the hunters' license fund, and I think that is available. I think we have reached the point where deer are increasing so fast that it is advisable to recommend the repeal of the Buck Law for five years.

Mr. Creasy: I think that we should not try to change the game law, but what we should try to do is to protect our property. If the game commission will protect this property by putting a wire fence around it, that is as far as we ought to go. When we try to change the game laws, we will get up against some other proposition.

Mr. Tyson: The matter as it has come to us, has looked serious enough to make it worth our while to bring it before this Association. Without wishing to trample on the rights of the hunters of wild game, recognizing them, we do feel that sufficient serious damage has been done to the fruit growing interests of this State, to warrant our taking notice of the matter. Cases of damage all the way from a few hundred dollars to several thousand dollars per individual have come to our notice, and in the absence of the ability of any individual to sue the State for damage of that kind, it has been up to the game commission to investigate the damage as they see fit, and to pay as they felt inclined, apparently. In a few cases that we know of, damage has been paid. In one case that I have in mind, damage of over \$3,000 was paid to one individual. In a lot of other cases where very serious damage has been done, up to this time nothing has been collected, and some of us who live at some distance from forest lands and State reservations naturally feel inclined to let the matter slide by, because we do not realize what it means; but I have seen young apple orchards that, year after year, in a certain season when the young growth was taking place, have simply been browsed back, eaten back, until the trees are in such condition that you or I would not have them in our orchards at all, and the only alternative is to take them out and plant young trees and have the same process repeated; the matter is serious enough to deserve our consideration. In one part of the State where there has been quite a lot of trouble of this kind, I asked one of the growers to give me some facts, but it is very late and I do not feel that we ought to take up the time of the meeting with this whole letter, but he gives here numbers of trees owned by different growers that were entirely destroyed, others that had the buds of various crops entirely destroyed, and in just a little community of a few growers in this particular case, in one township, the total number of trees here given is 1145 trees that were practically put out of business in just a short time. These people feel, and it has been our observation, that this difficulty has very much increased since the protection of the does; they feel that the passage of the so-called Buck Law has made the matter worse, and that no damage that can be paid by the State will compensate them for the labor and the disappointment in attempting to grow an apple orchard. The attitude that the State game commission seems to take, at least through its employees, is that the orchardist,

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the farmer who plants an apple orchard in close proximity to State reservations or State land is a fool. "There are the deer, you know the deer will browse your trees, you are foolish to plant trees there," which is a ridiculous attitude to take, because through our State College and through our State Department of Agriculture, we are spending large sums of money to reclaim to better agriculture, the waste places in the State, and it is unthinkable. The people with whom I have talked, who have been the worst hurt in this matter, feel that they ought to be paid for the damages, they feel that the damages that have been committed, and are sure to be committed again in the near future, ought to be compensated for as far as possible, but they feel that no real relief can come until the total number of deer at present is reduced; and that that can only come about through an open season for does.

Mr. Creasy: In three or four townships in Monroe County a year ago this winter, a bunch of elk turned loose by the State—well, it is estimated that the destruction of fruit trees and winter grain in three or four townships there—if there had been \$5,000 disbursed, it would hardly have paid the damage. I know of one small orchard where there were young trees, and if the owner had been offered \$500 for turning them in there, he would have laughed at the offer; and there seems to be no redress. I move that this matter be referred to our Legislative Committee with full power.

The Chairman: There is a motion already before the house.

Mr. Creasy: I think that the State should pay the damages or make restitution in some way, as long as the hunters' license is in operation.

A Member: Just a word. This is a very important matter and I hope you will realize the seriousness of it. We deserve to be paid for those damaged and destroyed trees, every bit or more so than the owners of tuberculous cattle. I see no reason why the money of the State should be paid out for tuberculous cattle, and not paid for this destruction, when the deer are protected just for the fun of the other fellow, and the quicker we come to know and realize that fully, the better it will be for all of us.

Mr. Strasbaugh: I happen to live in a community where the deer is doing considerable damage, and, as regards compensation, it does not look to me as though we are going to get that. How are you going to compensate us, I would like to know? Now we never had any trouble in our community until there was a closed season for does. I have lived there all my life and know this to be a fact. Some of my neighbors who live a little closer to the State land, have had more damage than I have had; until the last season they have not bothered my trees, but I have a neighbor who has worked hard all his life and four years ago he planted a plot of about seven acres of apple trees and today I would not give him fifty cents for them. Now, at that man's age, he needs something more than a wage for a day's work, and he would have had it, his apple trees would begin to bear now, at that age, and bring him in some money, but today they are not worth anything, because they

have been practically destroyed by the deer. Suppose they compensate this man for the loss of his trees—he is just where he started. If a man comes and steals your property, you put him in jail, you remove the cause, but you are not going to do that with the deer, you are going to let the deer go ahead and destroy your trees again. We must practically go out of business or there must be something else done. It isn't any use to talk about compensating us one year after another. Now I believe it is conceded that an apple tree is worth a dollar for each year's planting; we go to the expense of planting an apple tree and all that, and deer come along and destroy it and we get our dollar for it; where are we getting anything over our expenses, I would like to know; the time of the land is taken up, so I do not see why, when we were there long before the deer were there in numbers and became destructive, we were there first and planted our apple trees first, I do not see why we should not be protected; and if the deer is going to continue—which they will unless there is some means to keep them from destroying our trees—we have to go out of business. The best thing is this, it is not the property owners of our community who hunt the deer and shoot the deer, we are simply feeding that game, growing that game for other people to have sport with, we don't get them; the fruit grower doesn't have time to hunt deer nor the average farmer doesn't have time. This is a mighty serious thing. I have another neighbor who came in there and bought a farm that was not of very much value, but there was at least six or seven acres planted in apple trees, maybe a little more than that, that had been practically destroyed and he planted them again, but now he is up against the same thing. Now that thing will go on unless the number of deer is less so that they will not destroy them. This year I found they destroyed a considerable amount more. Another neighbor tells me that he has about 200 apple trees that have been bearing six or eight years, and the lower limbs were eaten off. How are you going to compensate that man, I would like to know, and leave the deer there?

Mr. Creasy's motion was then adopted.

Mr. Gibson: Does this Association want to go on record as in favor of repealing the Buck Law for five years? The Legislative Committee felt like making that recommendation to the Association for their consideration. It is a question in our mind whether the Association ought not to take recognition of the increasing amount of damage that the increase in deer is doing, and it is the Buck Law that has increased the number of deer. I think the hunters realize that the deer have reached the point where they are getting too plentiful, themselves. I think there is a feeling even among hunters that the deer are getting too numerous, and there might be a chance to raise the question. The Legislative Committee recommends to the Association that they commend the passage of a law repealing the Buck Law for a period of five years, and I make that as a motion.

The motion was seconded and adopted and the Association then took recess until 2:00 P. M.

Thursday, January 25th, 1917—2:00 P. M.

THE FIRST TEN YEARS OF A COMMERCIAL APPLE ORCHARD

V. H. DAVIS, Ohio State University, Columbus, Ohio

Some twelve or fifteen years ago, the speaker acquired a rather severe case of Orchard fever, which finally resulted in the planting of the orchard under consideration. The orchard is now in its eleventh year, and the summaries indicated in the tables cover the first ten years' work. No effort has been made to make the orchard an ideal one. No petting or coddling has been done, regardless of expense. In fact many things have been done slowly, and by piece meal, that should have been done at once and early in the life of the orchard.

The general welfare of the orchard, for a long period of years, has been kept uppermost in mind—rather than immediate returns. In short, we have tried to manage the orchard in a thoroughly practical and businesslike manner, and while several mistakes are apparent to us now as we look backward over the first ten year period, the changes suggesting themselves would have made little difference in financial summary presented herewith.

Before embarking in the undertaking, we tried to get some idea of the probable cost of starting an orchard from successful men who had been through the mill, but failed absolutely. At the time, we thought the vague and indefinite statements of practical orchardists along this line was due to a feeling that we were trying to meddle with their business, but now we feel sure that the real reason was a lack of knowledge. We, therefore, determined to keep some kind of cost records for our own information, and with the hope that we might contribute something to the economics of horticulture, which would be helpful to all.

With respect to methods, we could find no precedent and, therefore, were compelled to work out our own scheme, which is far from perfect, yet, for our conditions seem to be practical, without being burdensome, and distributes the principal items of expense sufficient for most purposes.

It is recognized that these various items of expense will differ with soils, location, price paid for labor, etc. The real value of such figures will come, when they are available from various sections covering the same periods, in the development of the orchard. In the meantime, we present our results for our condition and for what they are worth, hoping that others may be induced to present similar results for comparison and study.

Our orchard is located near Milford Center, Ohio, on rolling land with an average elevation of 60 feet above the level of Darby creek. Three "draws" or shallow ravines cut through the orchard to the creek, thus providing splendid air drainage for the elevation available.

The soil is a rather heavy clay loam. The native timber was oak, hickory, walnut and maple. Through more than fifty years of poor farming the land had become extremely unproductive, and in places badly gullied.

While the surface drainage is excellent, the rather heavy nature of the soil makes underdrainage necessary over a large part of the orchard. Ravines, fence rows and scattered trees required considerable clearing. This work yielded some 10,000 feet of fairly good lumber that has been used in various ways about the farm. About twenty acres had had the timber cut off only a few years before, and many of these large stumps have been removed by the use of dynamite.

Line and road fences were practically new. Several cross fences were removed, leaving only two fields separated by the roads.

While located only about $1\frac{1}{2}$ miles from shipping point, the roads were dirt and often very bad. Since we have owned the farm, however, both roads through the same have been graded and graveled. This improvement has been largely responsible for our high tax rate, but has added much more than the amount of our taxes to the value of the land.

The buildings on the farm, at the time of purchase, consisted of a five room cottage-house in bad repair and a new barn 30 x 60. We have since built another five roomed house with the necessary outbuildings. Two wells have been drilled and two concrete cisterns built. No effort has been spared to make the houses convenient and comfortable for the men and their families.

As will be seen from the tables, the working plan shows these divisions, viz., *the orchard, small fruit and poultry*.

The orchard is the division of paramount importance. All others are contributory to it. Each tenant keeps a flock of poultry on a share basis. The farm furnishes the stock and feed, while the tenant and his family contribute all the necessary care. The sales are divided equally.

Small fruits have been grown between the trees in 5 or 6 acres of the orchard. These crops are being gradually dropped as the work of the orchard becomes more extensive. While the small fruits have showed some profit, it is a question whether under our soil conditions, it would not have been better in the long run to have devoted the labor and time toward soil improvement, particularly the addition of organic matter.

Some corn and oats were grown during the early years, but later these crops dropped, as our soil gave rather low yields, and the orchard work sometimes suffered while these crops were being cared for. Sufficient hay has always been cut for our own use and sometimes a surplus of a few tons. Not more than 10 tons of hay has been taken out of the orchard during the ten years, and this has been replaced many times over by manure, straw, etc.

Orchard planting began in the spring of 1906, with 2,500 trees. This planting did unusually well. Very small losses occurred and the growth was good from the start. In 1907, 3,375 apple trees were planted and 500 pear under what seemed ideal conditions, but the loss was very heavy. These losses proved to be general for the season, and were attributed to the winter injury of nursery stock the previous year.

In 1908 and 1909 about 500 peach trees were planted as fillers. We had little faith in the peach under our conditions, but thought they might give a crop or two before they would have to be removed. In 1910, 300 additional apple was planted and 375 cherry along the road running through the farm. In 1915 the pear were pulled out and replaced with apple. This change was made necessary on account of the blight.

Whenever the lay of the land permitted, the trees were planted by plowing a deep trench to receive the trees. This plan proved a cheaper and more rapid method than digging individual holes. It also gave better results generally, doubtless due to the better breaking of the soil beneath the trees.

The sod mulch plan of management was adopted, except in that portion of the orchard interplanted with small fruits. All the materials grown in the orchard were used as mulch, supplemented with from 20 to 60 tons of straw, clover chaff and manure, yearly. In 1907 some ten acres of sweet clover was sown. This sowing largely winter killed, but the next year the same area was re-seeded with good results. Sowings of this plant have been made every year since. About 60 acres of the orchard will be growing this plant next season. In our opinion no crop equals the sweet clover for soil improvement purposes, especially in the beginning stages before other legumes can be made to grow satisfactorily.

In 1910 a cultivation and fertilizer test was started. To date the fertilizers have shown little results, either on the growth of the trees or the amount of fruit. Cultivation, however, soon showed decidedly better growth than the mulched sections, but somewhat less fruit. In the light of these experiments, the entire orchard is being thrown under cultivation as fast as possible. Plowing is being done with the Spaulding plow which cuts from 10 to 16 inches in depth. Soy beans are grown the first summer after plowing and sweet clover sown in the winter. It is our plan to go over the entire orchard twice, with the deep plow, before the trees get larger, growing and turning under all the organic matter possible.

In 1913 and 1914 twig or fire blight was bad on the pear and also on the Transparent, Jonathan, Benoni, Rome Beauty, Wealthy and York. In the spring of 1915 the pears were removed and replaced with Stayman.

Very little spraying was done prior to 1911. The trees were free from scale and any serious leaf diseases. While this plan is hardly to be recommended, no serious harm has resulted in our practice. From 1911 two sprayings have usually been given each year. The dormant spray has always been applied, while in some

seasons the blossom spray has been applied only to those sections showing some bloom. A special point is made of thoroughness, as far as spraying is carried. Last season the average amount of material per tree for the entire orchard, each spray, was a little over three gallons. Many of the larger trees received over five gallons. During the ten year period one power sprayer has done all the work. At present another has been added.

Pruning has been done after a pretty well defined plan. Although many may not agree that it is the right one, all trees are severely headed back at planting time, in the manner usually described. The second year's pruning is confined almost entirely to cutting dead stubs back to healthy tissue and correcting any minor faults. The top is then gradually thinned and formed, with considerable heading-in until the seventh to ninth year, when pruning is light. After fruit bearing begins, more thinning is done to keep trees open, and yet growing plenty of new wood. 1915 was the first year the fruit crop assumed commercial proportions, a little over 1,300 bushels being harvested.

Very little fertilizer has been used outside the experimental plot, excepting stable manures. The general results from the use of fertilizers have been negative, except upon the growth of cover crops. These have always responded and inasmuch as our principal need seems to be organic matter, fertilizers will be much more liberally used in the future—after prices again become normal.

The principal varieties of apples grown are Transparent, Duchess, Wealthy, Grimes, Jonathan, Stark, Stayman, York, Rome, Gano and Minkler.

As in all productive business, the labor problem has given us some concern.

We have been fortunate in securing excellent men as permanent help. Our chief trouble arises in securing the necessary day labor needed—in the spraying season, especially; \$1.50 and \$1.75 per day is the current wage for this type of labor. We make every effort to give our permanent men a good home, and treat them in every way as we would expect to be treated. Three of our men have remained on the farm for five years or more. One died in 1915 and the other two are still with us. They are paid by the month, with certain perquisites, and their wages automatically increase each year as long as satisfactory. Daily records are made of all labor performed.

Table I shows the distribution of expense by the year, with totals and invoice, December 31, 1915.

Investment includes the original cost of the land, all permanent improvements as buildings, new fences, tiling, clearing, original plantings of both tree and small fruits, stock, tools, etc.

Maintenance and operation covers all current expenses as pruning, spraying, cultivation, mulching, replanting, harvesting, etc. Column G—Miscellaneous, under orchard, requires some explanation, as the total is large. The labor charge in each case

is man labor only. The cost of all feed, either grown or purchased, has been thrown into this column, as well as all other items not chargeable to the heads indicated. There is yet some 20 acres to be set, upon which hay or some other crop is being grown in preparation for trees. Stumps are being removed and tilling done. All these items do not belong to orchard for the first ten year period, but inasmuch as the proposition is solely an orchard one, intended to cover thirty or forty years, it seemed the easiest way to carry these items in this manner. As the years go by, these charges should become proportionately less. Packages have also been charged here, but for the next period will be given a heading of their own.

Marketing costs need little explanation, as they have been very light so far.

The overhead charges explain themselves.

Invoice covers the actual value of all equipment, etc. Trees are invoiced at 50 cents per year of age. This price is a minimum one and should be a safe valuation upon which to base our calculation.

One item deserving especial attention, and often lost sight of, is the interest accumulation through the long period of waiting.

Invoice December 31, 1915

Horses and harness.....	\$ 600.00
Cultivating tools.....	250.00
Wagon, sleds, etc.....	200.00
Small tools.....	60.00
Spraying machinery, and materials.....	270.00
Poultry and supplies.....	275.00
Crates and baskets.....	25.00
Corn, hay, oats, etc.....	550.00
Books, stationery, labels, etc.....	30.00
Miscellaneous.....	100.00
Farm and improvements.....	10,990.00

Trees

2000 apple, 10 year.....	10,000.00
2500 apple, 9 year.....	11,250.00
1000 apple, 6 year.....	3,000.00
300 apple, 5 year.....	750.00
200 apple, 4 year.....	800.00
500 apple, 1 year.....	250.00
200 cherry, 4 year.....	400.00
	<hr/>
	\$39,800.00

TABLE II—DISTRIBUTION OF SALES

	Sundry Crops	Orchard Fruit	Poultry	Small Fruit	Total
1906	\$111.70	.....	.....	.....	\$111.70
1907	394.49	.....	\$24.83	.....	419.32
1908	462.00	.....	48.64	.....	510.64
1909	403.10	.....	114.76	\$538.99	1056.85
1910	99.18	.....	90.73	430.22	620.13
1911	61.30	.....	186.51	566.35	814.16
1912	200.75	\$17.50	175.74	1205.93	1599.92
1913	52.25	46.97	162.24	1089.81	1351.27
1914	236.44	136.50	358.41	743.21	1474.56
1915	183.00	688.90	233.23	528.61	1633.74
	\$2204.21	\$889.87	\$1394.09	\$5103.12	\$9592.28

TABLE IV—A FEW COST ITEMS FOR 10 YEAR PERIOD
Cost of Transplanting 7,000 Trees

Total Labor Cost.....	\$ 403.69
Cost per Tree.....	.0576

Cost of Pruning

Average Number of Trees, 5,000

Total Labor Cost.....	583.96
Cost per Tree.....	.116

Cost of Spraying

Average Number of Trees, 5,000

Cost Materials.....	583.35
Labor Cost.....	1066.30
(Including Team)	
Cost of Materials per Tree.....	.116
Cost of Labor per Tree.....	.213
Total Cost per Tree.....	.329

SOME INSECT PESTS OF FRUIT TREES

C. H. HADLEY, Extension Entomologist, State College, Pa.

Success in fruit growing is dependent upon a number of factors, not the least important of which is the successful handling of the insect problem. Nearly 500 species of insects have been noted as attacking the fruit, trunk, branches and leaves of apple, but fortunately for the fruit industry, only a very few of them cause enough damage to be considered. Among these few, the following are undoubtedly of prime importance in the production of sound fruit: codling moth, curculio, red bug, and aphids. Besides these, the various scale insects and borers are of chief interest, because of the direct lessening of the vitality of the tree which acts as their host.

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Fruits		Poultry		Total		Total	
	Materials	Labor	Materials	Taxes	Miscellaneous	Expenditures	Sales
1906 Labor expense	.....	\$ 3.32	.....	.....	.....	\$ 561.70	.....
Other expense	.....	.....	.....	30.33	.....	7,430.32	.....
Total for year	.....	3.32	.....	30.33	.....	7,992.02	\$ 111.70
1907 Labor expense	2.21	13.28	.....	24	.....	1,121.78	.....
Other expense	2.21	13.28	.....	50.92	14.25	2,488.73	.....
Total for year	.....	.....	.....	50.92	14.25	3,610.51	419.32
1908 Labor expense	.....	14.35	.....	.....	.....	829.64	.....
Other expense	67.07	14.35	49.31	44.15	234.11	2,336.71	.....
Total for year	67.07	.....	49.31	44.15	234.11	3,166.35	510.64
1909 Labor expense	57.42	17.28	85.52	.....	.....	1,021.72	.....
Other expense	57.42	17.28	85.52	86.52	414.79	2,140.54	.....
Total for year	.....	.....	.....	86.52	414.79	3,162.26	1,056.84
1910 Labor expense	188.34	30.51	108.46	10	.....	1,064.78	.....
Other expense	188.34	30.51	108.46	42.67	184.97	2,866.80	.....
Total for year	.....	.....	.....	42.67	184.97	3,931.58	620.13
1911 Labor expense	19.47	33.71	125.33	.....	32.33	1,212.70	.....
Other expense	19.47	33.71	125.33	100.29	311.28	2,780.01	.....
Total for year	.....	.....	.....	100.29	343.61	3,992.71	814.16
1912 Labor expense	211.19	.....	37.05	.....	118.30	1,316.55	.....
Other expense	211.19	.....	192.32	183.61	254.47	3,270.43	.....
Total for year	.....	.....	229.37	183.61	372.77	4,586.98	1,599.92
1913 Labor expense	.....	48.42	.....	.....	.....	1,379.64	.....
Other expense	94.31	48.42	202.01	197.00	60.21	2,840.00	.....
Total for year	94.31	.....	202.01	197.00	60.21	4,219.64	1,351.27
1914 Labor expense	50.00	43.30	78.06	.....	38.49	1,229.37	.....
Other expense	50.00	43.30	78.06	303.63	153.65	3,333.63	.....
Total for year	.....	.....	.....	303.63	192.14	4,563.00	1,474.56
1915 Labor expense	30.50	18.72	27.70	1	25.07	1,147.73	.....
Other expense	30.50	18.72	27.70	109.24	209.61	3,333.21	.....
Total for year	.....	.....	.....	109.24	234.68	4,480.94	1,633.74
Grand total.	720.41	222.89	905.76	7148.36	2,051.53	43,705.09	9,592.28

Total sales, \$9.

Total Expense

Theoretical balance

TABLE I

Investment												Maintenance and Operation												Marketing									General Expense							Total	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Orchard					S. Fruits		Poultry		Equipment			Orchard					S. Fruits		Poultry		Equipment		Orchard			S. Fruits		Poultry		Salary	Print- ing	Ins.	Int.	Taxes	Miscel- aneous	Expend- itures	Sales																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Land	Trees	Clear. Tilling	Labor	Fenc.	Bldgs.	Plant	Labor	Stock	Bldgs.	Stock	Tools	Prun- ing	Spray- ing	Cult.	Mich- ing	Har- vesting	Fert.	Miscel- aneous	Labor	Material- s	Labor	Material- s	Labor	Material- s	Trans.	Sal. & Com.	Adv.	Trans.	Sal. & Com.									Adv.	Trans.	Sal. & Com.	Adv.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1906 Labor expense.....		\$ 100.19	\$37.81									\$ 2.70	\$ 3.17		\$ 2.10	\$.53	\$ 5.54	\$ 381.10				\$ 3.32		25.24											\$ 162.90	\$ 4.00	\$ 5.56		\$ 30.33		\$ 561.70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Other expense.....	\$5,975.72	242.11	141.75		\$ 61.77			\$16.70	\$75.60	\$ 200.00	215.15	2.70	3.17		2.10	.53	5.54	288.85				3.32		25.24											162.90	4.00	5.56		30.33		7,430.32																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
Total for year.....	5,975.72	312.30	179.56		61.77			16.70	75.60	200.00	215.15							609.95																						7,992.02	\$ 111.70																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1907 Labor expense.....		173.73	24.94			124.93	\$40.25					8.14		6.53	20.24		26.57	394.47	44.30		13.28		244.40											237.69	12.50	6.00	140.00	50.92	14.25	2,488.73																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Other expense.....		206.50	107.60			893.98	140.87	21.50		60.00	28.00						26.57	49.71	44.30	2.21	13.28		244.40											237.69	12.50	6.00	590.00	50.92	14.25	3,610.54																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Total for year.....		380.23	132.54			1,018.91	140.87	40.25		60.00	28.00	8.14		6.53	20.24		26.57	444.18	44.30	2.21	13.28		244.40																		1,121.78																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1908 Labor expense.....		72.32	80.31			20.19	23.45					9.92	4.40	18.12	40.79		22.40	290.57	140.67		14.35		92.14											265.92	12.15	7.03	115.25	44.15	234.11	2,336.71																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Other expense.....		73.38	213.70		\$ 7.99	316.45	134.19	41.35	77.70		31.91				8.70		7.25	65.64	140.67	67.07	14.35	49.31	92.14	23.46										265.92	12.15	7.03	655.25	44.15	234.11	3,166.35																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Total for year.....		145.70	294.01		7.99	336.64	134.19	23.45	41.35	77.70	31.91	9.92	4.40	18.12	49.49		29.65	356.21	140.67	67.07	14.35	49.31	92.14	23.46																	829.64																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1909 Labor expense.....		32.45	48.30			50.00						21.91	2.88	106.13	47.15			347.68	262.07		17.28		85.87											222.10	7.90	12.50	630.00	86.52	414.79	2,140.54																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Other expense.....		52.75	4.10			60.04							22.60				64.75	112.95	262.07	57.42	17.28	85.52	92.14	23.46									222.10	7.90	12.50	50.00	86.52	414.79	3,162.26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Total for year.....		85.20	52.40			110.04						21.91	25.38	106.13	47.15		64.75	460.63	262.07	57.42	17.28	85.52	92.14	23.46																	1,021.72																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1910 Labor expense.....		25.00	7.63			21.30	25.50					21.44	2.75	110.74	55.61			412.82	250.17		30.51		101.31											330.00	8.00	6.00	50.00	42.67	184.97	2,866.80																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Other expense.....		70.03				152.07	152.15	18.05		460.00	30.69						102.70	127.30	250.17	188.34	30.51	108.46	101.31	70.37									330.00	8.00	6.00	765.00	42.67	184.97	3,931.58																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
Total for year.....		95.03	7.63			173.37	152.15	25.50	18.05	460.00	30.69	21.44		2.75	110.74	55.61		102.70	540.12	250.17	188.34	30.51	108.46	101.31	70.37																1,064.78																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
1911 Labor expense.....		46.34																326.68	404.98		33.71		11.51																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

Total sales, \$9,592.28 plus Invoice, \$39, 800.00=	\$49,392.28
Total Expense	<u>43,800.00</u>
Theoretical balance	\$ 5,592.28

APPLE INSECTS

Codling Moth

Although the codling moth (*Carpocapsa pomonella*), is one of the oldest insect pests of the apple, it still remains as the most destructive throughout the country. The appearance of the "wormy apple" is so well known that no description is needed.

Briefly the life history of the insect is as follows: The full grown larvae pass the winter in cocoons underneath, or in the crevices, of the bark. About blossoming time the larvae transform to pupae within the cocoons, and the moths emerge from two to four weeks later, depending upon the locality and the weather conditions. Within a few days after emerging, the female moths commence laying their eggs, most of them at this season of the year being laid on the leaves. In about a week, the eggs hatch. This is usually from three to four weeks after the blossoms fall, and it is important that the second spray for codling moth be already applied by the time the eggs hatch. The young caterpillar may feed to some extent on the tender foliage before going into the apple. It has been found that approximately 75% of the young caterpillars enter the apple through the calyx or blossom end. This fact explains the importance of applying the first spray for the codling moth just after the petals have fallen, and before the calyx lobes have closed; some of the poison will lodge in the calyx cup and be ready for the young caterpillar when it takes the first meal within the calyx cup. The other 25% of the caterpillars enter at the stem end, or at the side where a leaf happens to touch the apple. The caterpillar becomes full grown in from three to four weeks and leaves the apple, making the large, conspicuous, round hole in the side. The full grown caterpillar is about three-quarters of an inch long, pinkish in color, with a dark colored head, three pairs of legs near the head and five pairs of "prolegs" or false legs along the body. The caterpillars usually form their cocoons on the tree trunks, as mentioned before. In sections where there is but one brood of the insect per year, these larvae hibernate here in their cocoons until the next spring. In those sections where there are two or more broods per year, these larvae transform to pupae. The length of the pupal stage of this first summer generation is about ten to twelve days; then the moths emerge, about two months after the eggs were laid in the late spring. Eggs laid by these second brood moths hatch, and of these larvae some enter the fruit and others feed on the outside of the apple, around the blossom end or on the face. Without doubt, there are at least two broods in many parts of Pennsylvania.

Control—In controlling the codling moth*, advantage is taken of the fact that the majority of the young larvae enter the apple at the blossom end. The first spray should be applied as soon as possible after most of the petals have fallen. As this is the most important operation in fighting the codling moth, no pains

*See the spraying schedule for apples at the end of this article for combination sprays suitable for dealing with the insects mentioned in this paper.

should be spared to make it as effective as possible. The second spray for the codling moth should be applied from ten days to three weeks later, depending upon the locality and the climatic conditions. In those parts of the State where there is normally more than one brood during the year, a later spray may be necessary, especially if the earlier spraying has not been done thoroughly. Arsenate of lead (4 to 6 pounds of the paste to 100 gallons of water), is the most satisfactory material to use. If the powdered arsenate of lead is used, only half as much should be used, 2 to 3 pounds.

Curculio

Although primarily an enemy of the stone fruits, the plum curculio (*Conotrachelus nenuphar*), is often a serious pest of apples, even more so than the true apple curculio (*Anthonomus quadrigibbus*). It is especially injurious also to peaches. With apples the damage is due chiefly to the feeding and egg-laying habits of the adults, which result in the early dropping of part of the fruit attacked, and the scarring and deforming of the rest.

The curculio hibernates during the winter in the adult beetle stage, hidden away under leaves or other trash. That stone walls, hedges or adjoining wood lots furnish especially comfortable hibernating quarters is shown by the greater injury to that part of the orchard lying nearest to such places. About the time the buds are bursting open in the spring, the beetles leave their winter quarters and go to the trees. The beetle is a small black and grayish-mottled insect about one-fifth inch long, with a black shiny hump on the middle of each wing cover. Its long beak or snout, at the tip of which are located the sharp jaws, is very conspicuous. As soon as the fruit is set the females commence laying eggs, making a crescent shaped puncture where each egg is laid. Both sexes also eat out small round holes in the apples. The egg laying period may extend over a month or more. The eggs hatch within a few days and the young worms burrow around in the pulp. Usually, infested fruits fall to the ground before the grubs mature, while in the case of apples, many of the young grubs are killed by the pressure of the growing fruit cells. When full grown, about three weeks after the egg is laid, the worm leaves the fruit, burrows into the ground an inch or so, and constructs an earthen cell, in which it pupates. About a month later the fully matured beetles emerge from the ground, and feed upon fruit for some time before seeking hibernating quarters. At this time of the year they eat out large conspicuous cavities in the fruit. This type of injury has been quite abundant in Pennsylvania the past season.

Control—Cleaning up trash and other favorable hibernating places, and frequent shallow cultivation during early and mid-summer, will help in reducing the numbers of the insect. Spraying with arsenate of lead is the best way of fighting this pest. The same materials and time of application as recommended above for the codling moth, will be effective in dealing with the curculio.

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Red Bugs

Many of the pitted, misshapen apples found during the past season in a large number of Pennsylvania orchards indicate the work of the apple red bugs (*Heterocordylus malinus* and *Lygidea mendax*). Both of these species of plant bugs have, in late years, ranked among the most serious fruit-deforming insects of New York State, and so far as the writer's observations go, are rather widely distributed in Pennsylvania.

Most of the injury is caused by the insects puncturing the young apples during May and early June. Many of the punctured apples fall to the ground, others dry up on the tree, while the remainder mature but are badly deformed and rendered unmarketable. Red bug injury may be distinguished from that caused by the plum curculio, by the fact that the red bug, in making the puncture, does not remove any of the tissue, and there is no resulting scabby scar such as characterizes curculio injury.

The eggs are inserted in the bark of the smaller branches during the latter part of summer, and hatch the following spring, soon after the opening of the leaves of the fruit. The small, bright red nymphs at once begin to puncture the tender leaves, causing clusters of minute reddish dots on the leaves. The dots are usually quite conspicuous and are the first indication of the presence of red bugs. The injury, however, is of slight consequence at this time. As soon as the fruit is set, the insects commence feeding on the young apples, thrusting their sharp beaks into the fruit. The red bugs molt five times and attain wings at the fifth molt. When fully matured they are about one-fourth inch in length. *H. malinus* varies in color from red to black, and the upper surface is thinly covered with white scale-like hairs, while in *L. mendax* the general color is lighter, and these hairs are lacking.

Control—In controlling these insects, it must be remembered that they are sucking insects, and therefore stomach poisons, such as arsenate of lead, will leave no effect on them. A contact poison must be used, preferably a tobacco extract, containing 40% nicotine. Various materials are on the market, such as "Black Leaf 40," "Nico-Sul," etc. The material should be used at the rate of 1 pint to 100 gallons of water, applied thoroughly just before the blossoms open. If the tobacco solution is used alone, 4 to 5 pounds of soap may be added to make the material spread better, but when used in combination with arsenate of lead or lime sulfur, the soap should be omitted. Since the insects are less active on dull, cool days, spraying should be done on bright warm days, and great care must be taken to do a thorough job.

Aphids

There are several species of aphids which attack the fruit and foliage of apples. In Pennsylvania the more common species are the rosy aphid (*Aphis sorbi*), the green apple aphid (*Aphis pomi*), and the European grain aphid (*Siphocoryne avenae*), of which the first two probably do the most injury. Although they differ some-

what in habits and structure, from the standpoint of orchard economy they are quite similar in their injurious activities, and therefore all the species will be included in the general discussion.

The eggs are laid chiefly late in the fall, in October and November, on succulent twigs, in crevices of the bark, or at the bases of the buds. They appear as small, shiny-black oval eggs. As the buds begin to swell in the spring, the eggs hatch, and the so-called "stem mothers" seek the green ends of the opening buds to feed. The stem mothers are wingless, somewhat pear-shaped, and bright green or brownish in color, depending on the species. They mature about the time of blossoming and commence to give birth to living young lice. These young lice mature and in turn produce living young, and during favorable seasons the production of lice thereafter may be very rapid. Part of the lice may develop wings and migrate to other parts of the same tree or to other trees nearby. Towards the end of the season, a generation of true males and females appear, mate, and lay the shiny black eggs which remain on the twigs over winter. Injuries from lice result chiefly from the extraction of plant juices, by the insects, in feeding upon the foliage and fruit. The early broods cause injuries to the unfolding leaves and immature blossom parts, and later to the setting and developing fruit. The leaves become curled, and in severe outbreaks turn brown and fall, resulting in more or less defoliation of the tree. The apples do not increase in size, and cling tightly to the twigs, forming "cluster" or "aphis" apples, which sometimes hang on the trees even into winter after the leaves are shed in the fall.

Control—The New York Experiment Station has found that the most effective means of combating the lice is a thorough spraying of the trees at the time when the insects are assembled on the tips of the green buds, and while the buds are compact. Tobacco solution (containing 40% nicotine), should be used at the rate of 1 pint to 100 gallons of water, with 4 or 5 pounds of soap. If the tobacco solution is combined with other spray materials, the soap should be omitted. If this first application has been neglected or has not proven entirely satisfactory, later sprayings should be applied, if necessary.

Scale Insects

There are three species of scale insects which are commonly found infesting apple trees. The notorious San Jose scale (*Aspidiotus perniciosus*), the oyster shell scale (*Lepidosaphes ulmi*), and the scurfy scale (*Chionaspis furfura*).

The San Jose scale is undoubtedly the most dangerous, and is almost universally distributed throughout the State. This insect has been fully described and discussed in earlier reports of the society and it is not necessary to go into any further discussion of its life history.

The oyster shell scale, while usually not as destructive as the San Jose scale, is probably equally as widely distributed. The scale differs markedly in appearance from the San Jose scale, the

female being about an eighth of an inch long, dark brown or blackish in color, and resembling very much an elongated oyster shell in general appearance. The male scale is smaller.

Briefly the life history is as follows. The eggs are to be found during the winter under the female scale. Shortly after blossoming time the eggs hatch, and after a few hours of traveling over the bark, the young insects settle down and commence sucking the sap from the bark. Soon the formation of the waxy covering is under way. The female scales become full grown in from eight to ten weeks, lay from 40 to 100 eggs, and die. In the north there is usually only one generation per year, but in the south there may be more.

The scurfy scale is less commonly met with. The female scale is dirty gray in color, irregular shaped and as large as the head of a good sized pin. The male scale is much smaller, elongate, snowy white and with three distinct ridges. The life history is similar to that of the oyster shell scale.

Control—The only effective method of handling the scale problem is by spraying with either lime sulfur or miscible oil. While it is true that the scales are subject to the attacks of certain natural parasites, and may also be affected by adverse climatic conditions, neither of these agencies can be relied upon to be effective. Even though it may be possible to see evidence of the presence of these parasites, nothing short of a 100% control is sufficient to make it safe to omit the dormant spray; and even then it would be worth while to spray with lime sulfur as a fungicide.

The regular miscible oil or lime sulfur spray, as used in controlling San Jose scale, is also effective against the other two species discussed.

Leaf-Eating Caterpillars

There are a number of leaf-eating caterpillars which are to be found in the orchard throughout the summer. Of these the most common are the tent caterpillar (*Malacosoma americana*), the white marked tussock moth caterpillar (*Hemerocampa leucostigma*), the red-humped caterpillar (*Schizura concinna*), the yellow-necked caterpillar (*Datana ministra*), and the fall webworm (*Hyphantria cunea*). While all of these have been more or less common during the past year, they seldom appear in sufficient numbers to make it necessary to make extra spray applications for them alone.

Borers

There are two species of borers which often are very destructive to young apple trees, the round headed borer (*Saperda candida*), and the flat-headed borer (*Chrysobothris femorata*). Of these, the former is usually the more destructive.

The parent of the round-headed borer is a large beetle, about an inch in length, silvery white underneath, and with several alternating brown and white stripes along the back. They appear in late spring or early summer. The females deposit their eggs in

slits in the bark of the tree near the base. The eggs hatch in a few weeks, and upon hatching, the young larvae tunnel into the bark and feed upon the sap wood. During the winter the larvae remain snugly hidden in the bottom of their burrows. During the second year, the larvae burrow deeper into the heartwood, and also spend their second winter in their burrows. The larvae become full grown in the third year, and forcing their way back toward the bark, pupate there. The following spring the adult beetles emerge.

The parent of the flat-headed borer is smaller than the previous species, and differs in coloration, being a bright metallic bronze-green color. The adults appear early in spring, and lay their eggs. The larvae feed mainly in the sapwood, but when nearly mature, bore into the heartwood to hibernate. In the early spring they work back to the bark and pupate; shortly afterward the adults emerge.

Control—"Worming" is probably the most satisfactory method of handling both these insects. Injecting small amounts of carbon bisulfide into the burrows has been tried at times with some success, although in some cases injury to the trees has been reported. The fumes of the chemical will penetrate all parts of the burrow and are deadly to any larvae within. As this gas is highly inflammable, great care must be taken to keep it away from flame. Painting the tree trunks from the ground up to a height of a couple feet or so has been tried with varying success. The material so far found to be most satisfactory for this use is concentrated lime sulfur, either commercial or home made. This method can only be used to supplement worming, however, and is not in itself a sure preventive of borer injury.

PEACH INSECTS

While area devoted to the growing of peaches is not as extensive as that of apple, it is yet a large and important fruit crop. The peach is not afflicted with as many different insect pests as is apple, and those of most importance are the peach tree borer, bark beetles, plum curculio, aphids, San Jose and terrapin scales. Of these, the curculio, aphids and San Jose scale have already been discussed in the preceding paragraphs and will therefore not be mentioned here.

Peach Tree Borer

The peach tree borer (*Sanninoidea exitiosa*), is undoubtedly the worst insect pest of the peach tree. As is true with most borers, the injury is caused by the larval or grub stage of this insect. Its presence is indicated by an exudation of gum, mixed with sawdust, usually close to or just beneath the surface of the ground. This is noticeable at any time of the year, but especially so late in the summer or early in the spring.

The insect passes the winter usually as a half grown larva, curled up in a thin silk covering under a mass of gum on the bark;

sometimes the larger worms will be found in the burrow instead of on the bark. When spring comes, they resume feeding, continuing the old burrows or starting new ones. They usually work in the trunk or roots of the tree a short distance below the surface of the soil. When full grown, the borer makes a rough brown cocoon, composed of silk and particles of bark and excrement; this cocoon is usually on the bark of the tree near the ground. The moth emerges in about three or four weeks. Mating occurs soon after the emergence of the moths, and eggs are deposited singly or in small groups on the trunk of the tree, near the base. These hatch in about ten days time, and the young larvae soon start their burrows into the soft bark. There is only one brood per year.

Control—Although there are many patented materials on the market intended to prevent borer injury, none of them are really satisfactory. In the long run, worming is the only practical way of handling the borer question. The trees should be gone over carefully late in the fall and again late in the spring or early summer, and the borers dug out wherever their presence is made evident by the masses of gum and sawdust. In digging out the borers, first remove the earth from around the base of the tree to a depth of four or five inches, thus exposing the larger burrows. By scraping the bark with a knife or brush most of the smaller ones can be located. In the fall especially, many of the borers will be found on the surface of the bark, covered with a mass of gum. In cutting, as far as possible, cut with the grain of the wood. After digging out the borers in spring, mound the earth around the trunk to a height of about a foot. This will cause any eggs deposited later to be laid higher up on the trunk, and cause the larvae to enter the bark farther from the roots, where it will be easier to locate and destroy them.

Various tree protectors have been recommended from time to time, but as yet none have been found to be as satisfactory as could be desired.

Protective washes of various kinds have been recommended from time to time. Probably plain concentrated lime sulfur, either commercial or home made, is as good as any. It is, however, not a specific by itself, and should be used as a supplementary measure together with worming and mounding as previously mentioned.

Bark Beetles

Several species of bark-beetles, more commonly known as shothole borers, attack peach trees, the most important of which are the fruit-tree bark-beetle (*Eccoptogaster rugulosus*), and the peach bark-beetle (*Phloeotribus liminaris*). The former attacks peach, apple, plum and cherry, while the latter attacks mainly peach and cherry. The presence of these insects is indicated by a "shot-hole" appearance of the bark—many small round holes, from which drops of gum exude.

The life history of the fruit-tree bark-beetle is as follows: The insects hibernate both as larvae and pupae beneath the bark. In the spring, the small dark brown beetles emerge. Each female immediately locates a suitable place, burrows into the sap wood, and makes an egg chamber about $\frac{1}{2}$ to 2 inches in length. From time to time she lays her eggs singly in each side of the egg chamber. Upon hatching, the young grubs start burrows of their own away from the parent burrow. Upon reaching full growth, the larvae excavate narrow cavities in the sap wood and here transform to the pupal stage. In about ten days they emerge as beetles and gnaw their way to the outside surface of the bark, coming out thru the small round holes already mentioned. There are several generations per year.

The life history of the peach-bark beetle differs from that of the fruit-tree bark beetle, chiefly in that the former hibernates as a full grown beetle. Otherwise the main points of the life round is essentially the same.

Control—Both species breed normally in trees which are in an unhealthy condition, either from lack of care, some injury or from some other cause. They do not seem to be able to breed in healthy, strongly growing trees, or in entirely dead limbs. To avoid an infestation by bark beetles, the trees should be kept in a vigorous, healthy condition by proper cultivation, pruning and spraying. After the beetles have entered the bark, there is no practical way of reaching them with an insecticide. Infested limbs or branches should be cut out and destroyed; badly infested trees should be removed entirely, to prevent further spread of the insects.

Terrapin Scale

The terrapin scale (*Lecanium nigrofasciatum*), is the worst scale insect affecting the peach, with the possible exception of the San Jose scale. The terrapin scale is easily distinguished from the San Jose scale, being rather large, nearly circular in outline, the back hemispherical and raised, brown in color and somewhat ridged. Its general appearance at once suggests a turtle or terrapin, indicating the origin of its common name.

The winter is passed by the fertilized female scales on the smaller branches. In the spring eggs are formed and from these the young scales, straw colored, escape and establish themselves on the leaves. During the latter part of the summer, winged males develop and fertilize the females; soon after the females migrate again to the bark of smaller branches, where they spend the winter. There is only one generation a year.

Control—Spraying with miscible oils is the most satisfactory method of control. Commercial materials may be used, at strengths

recommended by the manufacturers; or the following emulsion, recommended by the U. S. Department of Agriculture, may be used as a dormant spray:

Raw linseed oil.....	5 gallons
Gasoline.....	3 gallons
Soap.....	2 pounds
Water.....	92 gallons

Spray Schedule for the Apple

(Where pests are known to be absent, omit corresponding spray or ingredient.)

- 1. Dormant Spray**—Preferably just as buds begin swelling. Lime-sulphur, 32° Baume, diluted 1 to 9*; or any lime-sulphur concentrate diluted to a density of 1.03†. For scale, blister-mite, scab and other diseases. If aphids are hatching, add nicotine solution as in No. 2.
- 2. Scab or "Pink" Spray**—When blossoms first show pink, and flower clusters are spreading. Lime-sulphur, 32° Baume, diluted 1 to 30*; or any concentrate diluted to a density of 1.01. For scab or other diseases. Add tobacco extract (40% nicotine), $\frac{1}{2}$ pint to 50 gallons, for red bugs or aphids. If canker worms, bud-moth or other leaf eaters are present, add lead arsenate, 3 lbs. of the paste, or $1\frac{1}{2}$ lbs. of the powder in 50 gallons.
- 3. First Codling Moth or "Calyx" Spray**—May start when $\frac{2}{3}$ of the petals are off, and should be finished within 7 days after all petals fall. Lead arsenate, as in No. 2, for codling moth, curculio, and other fruit or leaf-eating insects. Lime-sulphur, as in No. 2, for scab and leaf spot. If red bugs or aphids present, add nicotine as in No. 2. (Use plenty of spray and direct it to fill calyx cups.)

*The second figure in all these dilution rates indicates the **total volume of spray** obtainable from one volume of concentrate. The amount of concentrate required to make up a tank of spray may be found either by **consulting the table below**, or by **dividing the capacity of tank by the second figure in the dilution rate**.

†The dilution rate needed to obtain sprays of any desired density may be obtained directly by testing the concentrate with a specific gravity hydrometer, and then dividing the decimal part of the concentrate reading by the decimal of the desired spray. Example:

$$\frac{(1) .27}{(1) .03} = 9; \quad \frac{(1) .24}{(1) .01} = 24.$$

The result shows the total dilution required. Also see table following.

4. **Second Codling Spray**—About 2 weeks after the completion of No. 3, although best applied when moths actually begin emerging as determined by cage observations in orchard.

Lead arsenate and lime-sulphur as in 2 and 3.

For codling moth, curculio, and other insects, scab, sooty blotch, apple blotch and fruit spot.

5. **Late Summer Spray**—About last week in July. (If second brood codling moth are bad, time this spray by banding a few trees and watching for cocoons to empty.)

Materials same as in No. 4. For second brood of codling moth, late feeding caterpillars, scab, sooty blotch, apple blotch, and fruit spot.

Where bitter rot or apple blotch is serious, bordeaux mixture (4-4-5), may be substituted for the lime-sulphur, and one or two additional applications may be made when needed.

Amounts of Lime-Sulphur Concentrate Required to make 50 gallons of the Principal Spray on the Apple

Reading on Hydrometer		Lime-Sulphur Concentrate Required		
Baume Degrees	Specific Gravity	Dormant Spray 1.03	Scab Sprays 1.01*	Later Sprays 1.008
		Gals. L.-S.	Gals. L.-S.	Gals. L.-S.
20	1.160	9.4	3.1	2.5
21	1.169	8.9	2.9	2.4
22	1.179	8.5	2.8	2.2
23	1.188	8.1	2.7	2.1
24	1.198	7.6	2.5	2.0
25	1.208	7.2	2.4	1.9
26	1.218	6.9	2.3	1.8
27	1.229	6.6	2.2	1.7
28	1.239	6.3	2.1	1.7
29	1.250	6.0	2.0	1.6
30	1.261	5.7	1.9	1.5
31	1.272	5.5	1.8	1.4
32	1.283	5.3	1.8	1.4
33	1.295	5.1	1.7	1.4
34	1.306	4.9	1.6	1.3
35	1.318	4.7	1.6	1.3
36	1.330	4.5	1.5	1.2

*This strength is usually safe and preferable in all foliage sprays on the apple, but the lower strength shown in the last column may be used wherever there is any important danger of spray injury.

Spray Schedule for Peaches

(Destroy all mummied fruit before growth starts)

- Dormant Spray**—In spring, before buds start.
Lime-sulphur, 32° Baume, diluted 1 to 9 (total), or any lime-sulphur concentrate, diluted to a density of 1.03; for San Jose scale and leaf curl.
For lecanium or other soft scales, use miscible oil, as recommended by manufacturers.
- Curculio Spray**—When the husks or calyces are being shed.
Lead arsenate paste, 3 lbs. to 50 gals., and 2 lbs. lime, slaked.
Add tobacco extract (40% nicotine), 1/2 pint to 50 gals., if aphids are serious.
- First Brown Rot and Scab Spray**—3 or 4 weeks after No. 2.
Self-boiled lime-sulphur (8-8-50); for brown rot and scab.
If curculio is serious, add lead arsenate paste, 2 or 3 lbs. to 50 gallons.
- Second Brown Rot and Scab Spray**—About 4 weeks before fruit ripens.
Self-boiled lime-sulphur (8-8-50); for brown rot and scab.
Where staining of fruit is very objectionable, lime-sulphur solution alone, 1.003, or 32° Baume concentrate diluted 1 to 100, may be substituted on varieties that are fairly resistant to spray injury.

TABLE II
Amounts of Lime-Sulphur Concentrate Required to Make 50 gallons of the Principal Sprays on the Peach

Reading on Hydrometer		Lime-Sulphur Concentrate Required	
Baume Degrees	Specific Gravity	Dormant Spray 1.03	Possible Final Spray 1.003
		Gals. of L.-S.	Quarts of L.-S.
20	1.160	9.4	3.8
21	1.169	8.9	3.6
22	1.179	8.5	3.4
23	1.188	8.1	3.2
24	1.198	7.6	3.0
25	1.208	7.2	2.9
26	1.218	6.9	2.7
27	1.229	6.6	2.6
28	1.239	6.3	2.5
29	1.250	6.0	2.4
30	1.261	5.7	2.3
31	1.272	5.5	2.2
32	1.283	5.3	2.1
33	1.295	5.1	2.0
34	1.036	4.9	2.0
35	1.318	4.7	1.9
36	1.330	4.5	1.8

THE FRUIT SHOW

SECRETARY'S NOTE—The Fruit Show was made possible by the support given the management by members and friends of the Association, who willingly contributed money to back up a cash premium list. The Secretary feels that these men deserve much credit and wishes to thank them for their support.

The contributors were as follows:

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Sunnyside Orchard Co., Tyrone, Pa.
J. C. Trees, Mars, Pa.
Tyson Bros., Inc., Flora Dale, Pa.
D. M. Wertz, Waynesboro, Pa.
Robert Brooke, Schwenksville, Pa.
H. W. Anderson, Stewartstown, Pa.
R. S. Wood, Lancaster, Pa.
Gillan Bros., St. Thomas, Pa.
K. P. Allshouse, Brookville, Pa.
H. A. Surface, Mechanicsburg, Pa.
W. G. Snyder, Beavertown, Pa.
Levi Meyers, Siddonsburg, Pa.
Calhoun Bros., Brockwayville, Pa.
Todd and Henry Reitz, Brookville, Pa.

- Class 9—W. C. Woodruff, Woodruff, Pa.
L. R. Phillips, Sprags, Pa.
James Church, Rodgersville, Pa.
Robert Brooke, Schwenksville, Pa.
D. M. Weitz, Waynesboro, Pa.
Tyson Bros., Inc., Flora Dale, Pa.
Sunnyside Orchard Co., Tyrone, Pa.
S. H. Calvin, Beaver County.
G. Reed, Beaver County.
Thomas Perry, Blair County.
Geo. Sergeant, Jr., Glen Mills, Pa.
Mrs. Caroline Reynders, Ulster, Pa.
J. W. Cummings, New Wilmington, Pa.
Hover Bros., New Wilmington, Pa.
J. B. Johnston, New Wilmington, Pa.
Thed Pershing, Pineville, Pa.
Abe Hostettler, Cambria County.
S. B. Kirsch, Cambria County.
J. A. Farabaugh, Cambria County.
O. S. Row, Williamstown, Pa.

- Class 10—W. C. Woodruff.
L. R. Phillips.
Sunnyside Orchard Co., Tyrone, Pa.
Tyson Bros., Inc.
H. A. Surface.

- Class 11—Sunnyside Orchard Co.
Peter Boltz, Lebanon, Pa.

- Class 13—H. A. Surface.

- Class 15—Robert Brooke.

- Class 17—Adams County Fruit Growers' Association.

Other Exhibitors not in Entries:

- William Gittinger, Pennoch apples.
J. A. H. Krug, Smith Cider apples.
Hope Sisters, New Wilmington, Stark apples.
R. G. Hoffman, R. D. 40, Wyalusing.
J. C. Long, Blair County, Red Streak apples.

PRIZE WINNERS

At the 58th Annual Meeting and Fruit Show

- Class 4—Best Box Arkansas apples
First premium Tyson Bros., Inc., Flora Dale, Pa.
- Class 4—Best box Stayman apples
First premium Tyson Bros., Inc., Flora Dale, Pa.
Second premium H. A. Surface, Mechanicsburg, Pa.
- Class 4—York Stripe, best box
First premium Tyson Bros., Inc., Flora Dale, Pa.
- Class 4—Grimes Golden, best box
First Tyson Bros., Inc., Flora Dale, Pa.
- Class 4—York Imperial, best box
First premium Tyson Bros., Inc., Flora Dale, Pa.
- Class 4—Rome Beauty, best box
First premium Tyson Bros., Inc.
- Class 6—Best three boxes, any variety
First premium—York Imperial, Arkansas, Stayman, Tyson Bros., Inc.
- Class 7—Best collection of five boxes, any one variety
First premium, York Imperial, Tyson Bros., Inc.
Second premium, Stayman, Tyson Bros., Inc.
- Class 8—Summer Rambo, plate
First premium, Tyson Bros., Inc.
- Class 8—Winter Rambo, plate
First premium, T. W. Niel, Dayton, Pa.
Second premium, J. B. Johnston, New Wilmington, Pa.
- Class 8—Wagner, plate
First premium, Ira Cherrington.
Second premium, A. B. Westover.
- Class 8—Baldwin, plate
First premium, Hover Bros., New Wilmington, Pa.
Second, T. W. Niel, Dayton, Pa.
- Class 8—King, plate
First premium, P. S. Cromley, Dansville, Pa.
Second premium, T. W. Niel, Dayton, Pa.
- Class 8—Hubbardston, plate
First premium, P. S. Cromley, Dansville, Pa.
Second premium, James Church, Rodgersville, Pa.
- Class 8—Arkansas, plate
First premium, Tyson Bros., Inc., Flora Dale, Pa.
Second premium, D. M. Wertz, Waynesboro, Pa.
- Class 8—York Imperial, plate
First premium, D. M. Wertz, Waynesboro, Pa.
Second premium, Tyson Bros., Inc., Flora Dale, Pa.
- Class 8—Jonathan, plate
First premium, D. M. Wertz.
Second premium, P. S. Cromley.
- Class 8k—Stayman, plate
First premium, Levi Myers, Siddonsburg, Pa.
Second premium, Levi Myers, Siddonsburg, Pa.
- Class 8—Ben Davis, plate
First premium, D. M. Wertz, Waynesboro, Pa.
Second premium, Geo. Sergeant, Jr., Glen Mills, Pa.
- Class 8—Rhode Island Green, plate
First premium, P. S. Cromley.
Second premium, Robert Brooke, Schwenksville, Pa.

- Class 8—Spy, plate
First premium, Ira C. Cherrington, Catawissa, Pa.
Second premium, T. W. Niel, Dayton, Pa.
- Class 8—Delicious, plate
First premium, Tyson Bros., Inc.
Second premium, Howard Anderson, Stewartsville, Pa.
- Class 8—Grimes, Golden, plate
First premium, E. M. Wertz, Waynesboro, Pa.
Second premium, Tyson Bros., Inc.
- Class 8—Winter Banana, plate
First premium, S. R. Huey, New Castle, Pa.
Second premium, N. E. Rhodes, Beaver, Pa.
- Class 8—McIntosh, plate
First premium, Gillan Bros., St. Thomas, Pa.
- Class 9—Best three plates, any varieties
First premium—York, Delicious, Stayman, Tyson Bros., Inc. Flora Dale, Pa.
Second premium—Hubbertson, Spy, Baldwin, Sunny Side Orchard Co., Tyrone, Pa.
- Class 10—Best five plates, any one variety
First premium—York Imperial, Tyson Bros., Inc.
Second premium—Stayman, Tyson Bros., Inc.
- Class 11—Largest and Best Collection of plates of different varieties.
First premium—36 plates of 36 named varieties, Sunny Side Orchard Co., Tyrone, Pa.
Second premium—24 plates of named varieties, three others of doubtful naming. Peter R. Boltz, Lebanon, Pa.
- Class 12—No entry.
- Class 13—Best plate, any variety, of pears
First premium—Dutchess, H. A. Surface, Mechanicsburg, Pa.
Second premium.
- Class 15—Best plate of quince
Second premium, Robert Brooke, Schwenksville, Pa.
- Class 17—Finest display of fruit by any county fruit growers organization
First premium, Adams County Fruit Growers' Association.

VEGETABLE GROWERS SECTION

CHAIRMAN'S ADDRESS

S. HERBERT STARKEY, Bustleton, Pa.

It is my duty as well as my privilege to make a few remarks at the opening session of this Convention. We again meet in Harrisburg, where, four years ago, about fifteen of us met in the parlor of the Commonwealth Hotel and held an informal meeting. We were nearly all strangers to one another, but it was a very congenial crowd and we certainly had not only a very enjoyable but very profitable meeting.

The next year we met at York; this was the only meeting I failed to attend, but I heard from those present that this meeting was even better than the year previous. The following year we met in Wilkes-Barre, with upwards of fifty members. Then again in 1916 we met in Reading with increased interest as well as numbers. This meeting speaks for itself. All of the previous meetings have been interesting as well as instructive, and I trust you will find this one the best of all.

Your Secretary has worked hard in arranging this excellent programme. I believe all the subjects to be discussed are of vital importance to the success of the Market Gardener.

The speaker on the subject of "Efficiency on the Farm" will be unable to be present, I regret to announce. I feel this is a very important subject. If we would give more thought to this question we might save considerable money. "A dollar saved is a dollar earned." You will, of course, have very little basis upon which to work unless you have some system of cost accounting. Some of you may say that this cannot be done on a farm, or that it is too much bother. I say it can be done. We have been keeping accounts for nearly four years. I now consider this the most important work on the farm. Without our accounts we would be working in the dark. If we could convince every man at this meeting of the importance of keeping cost accounts so that every one would go home determined to start this important work, I would consider we had done something of great value for the Market Gardeners of Pennsylvania.

Tomorrow morning the question of Insect Pests and Plant Diseases will be discussed by two men of wide experience in these lines. The Aphis were worse this last fall than I have ever seen them before. They practically destroyed all turnips, cabbage, and to a great extent the lettuce and spinach.

In the afternoon, the question of growing vegetables under glass will be discussed by men well versed on this subject, all having practical experience.

Now lastly, and probably the most important of all, is the packing and marketing of our produce. For several years we have

been taught to try and grow two blades where one grew before. This may or may not be right. I believe the majority of us have brains enough to grow the other blade, if we can be shown a fair profit on the one already grown. Most of us are packing and selling our produce precisely as did our fathers, and maybe our grandfathers. Can you show me anything else that is placed on the market as is our produce? I have reference to the Philadelphia market.

Nearly all of the near-by produce that comes to the Philadelphia market is packed in some kind of a second-hand box, barrel or basket. They are very often dirty and broken and very seldom covered. Only last week I attended a gathering of Commission Merchants. I asked the question, "What percentage of Pennsylvania produce coming on the Philadelphia market is packed straight from top to bottom." They answered, "Much less than fifty per cent." So you see there is much to be learned along this line.

MUSHROOMS

HAROLD W. WARE, Arden, Del.

Mushroom growing is no longer a game of chance—where excessive profits are staked against total failure. It has developed into a safe business where legitimate profits depend largely upon the man.

There are two reasons for this—good spawn and good markets.

Since 1900, when Dr. B. M. Duggar developed the tissue method of spawn production, the propagation of mushrooms has been as certain as the planting of any other "crop." For years commercial manufacturers have been using this method and selling definite varieties of reliable spawn. The imported English and French flake spawns have been practically eliminated and with them has gone the greatest element of chance.

Good spawn had a direct and natural effect upon the market. As the supply of mushrooms increased and became regular, prices reached a normal level. This led to a more extended demand. That this demand is increasing more rapidly than the supply, is evidenced by the steady increase of imports of canned mushrooms from France. The figures climbed steadily until in 1914, before the war, we imported more than nine million pounds of mushrooms in cans. Since the war, imports have dropped to four million pounds, but the demand has permitted the dealers to double the price to the consumer.

Some years ago a large grower near Philadelphia equipped a canning factory, hoping to compete with the French product. He and those interested with him, lost ten thousand dollars in learning that the French are able to sell a pound of canned mushrooms in our market for less than we can grow a single pound of fresh mushrooms.

The extent of the mushroom industry in the United States can only be estimated. Certain spawn manufacturers and others

estimate that three million to six million pounds are produced annually.

In mushroom growing, the handling of the compost is necessarily hard and dirty work. This must be kept in mind in selecting help. The men employed, will to some extent, govern the methods used.

To illustrate: Growers who employ Negroes and Americans have found houses with narrow aisles desirable. In these a portable track is placed. A truck holding several baskets is pushed in by the man as he rides. He then dumps the baskets into the beds and returns for more.

I could get better results using Italians. They were accustomed to wheelbarrows and I found they preferred these to a truck; so I built my houses with wide aisles to fit the Italian and his wheelbarrow. That three men can fill 4,500 sq. ft. of tier beds in 17½ hours, shows that such adaptation pays.

There are six steps in the actual production of mushrooms, which may be outlined as follows:

1. Composting.
2. Filling.
3. Spawning.
4. Casing.
5. General treatment during growing season.
6. Cleaning the house and preparing for another crop.

Composting. Fresh stable manure is the only material suitable for commercial mushroom growing. There are definite reasons why this is so.

FIRST. Moulds and other competing fungi develop readily in all manures containing soluble organic compounds. But the rapid fermentation and active bacterial action, which is possible in stable manure, renders it unfavorable to moulds without materially affecting it as a substratum for (*Agaricus Campestris*), the common mushroom.

SECOND. Stable manure contains all the elements of plant food in desirable form and the straw used in bedding gives it good physical condition throughout the growing period.

Composting, then, is essentially a weeding process which is accomplished by rapid, even fermentation without burning. By applying plenty of moisture to neat piles during several forkings over, we gain that end.

Filling. When proper fermentation is completed, the houses should be filled as rapidly as possible. There are several ways of judging whether that point is reached or not. Generally speaking, it requires from three to four weeks—the color of the straw is a dark brown—the odor is not objectionable, and the moisture content is right, if upon squeezing, water moistens the hand but does not drip from the manure.

The beds are usually eight inches deep. The manure is dumped into these beds, leveled and firmed with the back of a fork. The principal thing to keep in mind is the moisture content. The eight inches of compost is the reservoir not only of plant food, but of water for the entire crop. If the compost is very dry, tramping is necessary; if very wet, even light pounding may be undesirable.

After filling, the house is closed; the second heating takes place immediately, rises to 120° F. and then gradually drops to the spawning temperature, 70°.

Spawning. Spawn is the keystone of success with mushrooms. It is the most important single factor and no effort should be spared to get the best. All manufacturers naturally claim to sell the "Best" spawn, but I believe the larger concerns, with years of good results back of them, are more reliable than the smaller manufacturers.

There are two kinds of "pure culture" or tissue culture brick spawns on the market—"Direct" bricks and "Standard" bricks.

Briefly, these may be considered as "First" and "Second" quality. The direct bricks are manufactured direct from tissue culture—the standard bricks are made from the direct bricks.

The direct bricks cost three cents more than the standard. I think they are worth it. One brick plants eight square feet. I chop the bricks with a hatchet into approximately eight pieces.

When the temperature of the beds has dropped after heating to 70° F., the pieces are laid out on the beds about a foot apart. A man follows, with a spawning fork, and inserts the piece about an inch below the surface; then with the guard of the fork he punches the spot. It pays to firm the beds lightly after spawning, both to compact the moist manure about the spawn to start development, and to level the bed to allow an even distribution of the casing dirt.

About six or seven weeks after spawning the first mushrooms should appear.

Casing. When examination shows that the spawn is beginning to run, usually about three weeks after spawning, an inch of good sifted top soil is spread evenly over the beds. I made the mistake at first of not having enough on some of my beds, and when the houses were sprinkled, water ran through into the manure. This must be avoided; it reduces the vitality of the spawn and shortens the crop.

After spreading, the dirt should be firmed and leveled. Do not water until time for the first mushrooms to appear, unless the conditions are so dry that it is unavoidable. The casing dirt serves as a medium for picking and watering, and prevents rapid evaporation from the beds. It also forces the spawn into bearing.

General Treatment During Growing Season:

1. Heating.
2. Watering.
3. Ventilation; and
4. Picking,

are the details for consideration during the next three months of growth.

1. Heating. Heat is the controlling factor. At a temperature of 55°—58° F. mushrooms grow slowly and strongly and other competing fungi and insects are checked.

2. Watering. The casing dirt should be firm and moist at all times but not soaked. Sufficient watering to accomplish this is necessary. Never soak the beds even when dry—better sprinkle lightly twice. The air in the houses should be humid but not dripping.

3. Ventilation. The houses must be tight so that ventilation can be controlled. Proper ventilation avoids draughts and allows gradual evaporation from the beds. A complete change of air in houses each day, and rapid drying of the caps of mushrooms after watering is desirable. Select a clear day, so that the doors may be opened, at the time of watering. Under proper conditions it will not be necessary to water more than two or three times each week.

4. Picking. Picking is an art which can be learned only by practice. The picker grasps the cap and twists. Two baskets are carried on a frame which is hung to the beds. The end of the stem with the dirt and roots attached is cut off into one basket and the mushroom into the other.

Some mushrooms develop from buttons to heavy mushrooms; others on the same square yard push through and get no heavier. To tell the difference, and to do it rapidly, requires much skill. The Italian who picks for me is remarkably quick. He has picked over 200 pounds in less than a day and helped to pack some of them.

Cleaning the House and Preparing for Another Crop.

After a crop, thorough housecleaning is in order. Every speck of compost must be brushed out, the boards scraped, and every corner and surface whitewashed with a spray machine. Just before filling for a subsequent crop it is good insurance against disease to fumigate.

In a brief way, the foregoing outlines the principles of mushroom growing as I understand them. I have found it interesting and profitable. In several ways I departed from the general practice, both in the construction of my houses and in marketing.

As I mentioned before, my aisles are wide and in addition I put small windows at either end of all the aisles. We need lanterns for picking only on dull days. The effect of light on the development of the mushroom is one of temperature.

By installing a crude oil engine and fire extinguishers, we reduce the insurance to \$10.00 per thousand on the entire property.

We have kept books since the first crop and our expense account includes: Interest at 5 per cent., Insurance, Taxes, Depreciation, all Labor and Supplies. On that basis, we estimate our average cost of production per pound to be 18 cents. I believe it would be safe to figure, under average marketing conditions, that 25

cents return per pound could be counted upon throughout the season. Last year, figuring seconds, what was used at home and all forms of marketing wholesale and direct, we averaged a return of 28 cents per pound.

In other words, using regular business methods and taking in all the factors usually considered in business, I feel sure that mushroom growing is safe.

There are several interesting features connected with our marketing that could be applied perhaps to other lines.

The Parcels Post. Books of six post-card tickets are sold for cash. The consumer mails one of these postcards as a notice that they want a pound mailed to them. We have a regular parcels post box holding one pound.

The wholesale shipments are different from the average shipment in two respects.

FIRST. We line our baskets with green wax paper.

SECOND. We use an attractive label pasted on each basket.

The value of the compost after a crop of mushrooms has been grown, is, to my mind, greater than is usually supposed. Experiment stations and editors generally answered my inquiry with the belief that it was worth only half as much as fresh manure.

In a test plot experiment on field corn, using 3 tons fresh, 3 tons mushroom compost, 6 tons fresh and 6 tons mushroom compost, on plots separated by check plots, showed that the total weight of corn harvested from the mushroom plots was 59 pounds more than the fresh plots. The experiment was in duplicate and covered one-half acre.

If the compost is valuable—is free from weed seeds, it surely will recommend itself to market gardeners. And to my mind the growth of the mushroom industry in this country will be as a side line, rather than the development of large businesses by mushroom specialists.

It is a fancy product which enters into the same channels of marketing wholesale and retail as to other horticultural products. It gives variety and allows one to employ good men, profitably, the year round.

The mushroom houses give ideal conditions for forcing rhubarb and chicory, which can be grown as catch crops after a mushroom crop.

The demand of a widening market will keep prices at the present level for years to come.

In closing, I want to emphasize the innumerable details which are requisite to success and that only those whose other work and training fits them for mushroom growing should attempt it, but to these I can say again—

That mushroom growing is a safe business where profit depends not upon luck, but upon the man.

COLD FRAME VEGETABLE FORCING

R. W. DEBAUN, Market Gardening Specialist. Agricultural Experiment Station, New Brunswick, N. J.

With great pleasure I bring you greetings from the New Jersey Vegetable Growers. In my little talk this afternoon, I will try to tell you by word and picture of the cold frame vegetable growing industry, as developed in the intensive market gardening sections of the northern part of our State. Our growers are very successful with this line of work, as can be readily understood when we consider the fact that more than 150,000 sash can be seen within one square mile in Richfield, one of the many small towns in the vicinity of Newark, Paterson and Jersey City.

I have frequently heard of the fine work being done by the Vegetable Growers of Pennsylvania, especially in the vicinity of Harrisburg, Wilkes-Barre, Bustleton, Erie, Williamsport, Scranton, New Castle and Johnstown. I see before me men who are enthusiastic members of the Vegetable Growers Association of America. Therefore, I will present to you the methods used in handling our cold frame crops, with the hope that you may find a suggestion worth while, and with the desire that you practical growers and Experiment Station men will freely discuss the points I present, so that I may carry back to New Jersey some of your ideas which would be helpful to our growers.

Our gardeners usually locate their "frame yard" near the buildings and behind shelter from winds. The soil is previously prepared by being leveled up, heavily manured and frequently plowed. The frames are usually made of spruce boards, sixteen feet long, an inch and a quarter thick and ten inches wide. They are run northeast and southwest with a five-inch pitch towards the southeast, so that full benefit of the morning sun may be had. Each frame is usually made twenty-five sash long and the path between the frames is usually about 20 inches wide. The frame boards are nailed to 2 x 3 inch chestnut stakes two and a half feet long, driven into the soil on the outside of the frames. Twenty-three inch bolts with large washers are run across the path to hold the boards positively secure. The paths are filled with coal ashes. This covers the bolts so that they do not prevent walking, the cold wind is kept out of the beds and the cinders never get muddy. Frames well made are good for five years.

The first crop planted is Dandelion. Seed are usually sown the middle of July and, because of the nature of the seed and hot weather, they are very hard to get started. The method used is to wet the soil thoroughly, sow the seed very shallow in rows eight inches apart and cover the ground with a thin layer of salt hay. This holds moisture and prevents baking in case of heavy rains. After germination the hay is removed. By fall, the Dandelions will have made a strong root growth. Then, during the last part of the winter, after a crop of Escarole, Carrots, Parsley, Fetticus, Spinach, or what not has been grown under the sash, those sash

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which are not "busy" may be carried over and put on the Dandelion frames. In three or four weeks, the Dandelions will throw up a heavy new growth. Several barrels of greens will thus be cut from each frame and the sash may be moved back to the empty frames from which they came, so that these empty frames may be replanted about the first of March to other crops. The Dandelion frames are left unprotected, and the roots left in the ground may be left to develop another crop of greens the next year.

During the last part of July several frames are sown to Parsley, in rows twelve inches apart. Practically the same method is used as outlined above, to induce good germination during the hot weather. Parsley must not be sown too thickly or mildew may develop. A short, stocky, stiff, brushy, heavy rooted, dark green growth is most desirable. Sash are not put on until late in the fall. The Parsley is marketed during mid-winter.

Carrots are sown in the frames about August 1; the Nantes variety is used because it is of a good color, a quick grower, of sweet flavor and sure to produce a desirable root. The fall frame Carrots are usually planted in double rows ten inches apart. The double rows are actually an inch apart, but when growth gets started it looks like a single row. The object of the double row is to give the roots a better opportunity to develop, and, at the same time, provide for air among the tops between the ten-inch rows. The secret of success with Carrots in cold frames is to get the root growth, before the sash are put on in November to save the tops for bunching during the holidays.

Corn Salad or Fetticus is the next crop planted. The rows are usually about eight inches apart and the sash are put on soon after germination. This crop requires careful attention. It must be frequently ventilated and frost causes it to turn black. Damping-off frequently destroys this crop, especially if the bed is kept too moist or is insufficiently ventilated, or if the soil is badly infected with the damping-off disease.

Spinach is being grown considerably as a frame crop. A splendid crop is just being harvested. Our method is to sow the seed October 1st in rows six inches apart and put on the sash immediately. For best success the soil must be very rich and sweet. Some ventilation is essential every day.

A very limited amount of fall Lettuce is grown. However, several frames are frequently set with Escarole plants about the first of September. This green stuff is sold unbleached, and is in great demand, especially for the Italian trade.

This shows about what crops are planted for the fall trade. Of course, every gardener may not plant all the crops mentioned, but most of them try to have a few frames of each, because something always brings especially high prices and "they like to be in on it," no matter what the crop might be.

The spring crops are usually the most profitable, but many of the frames must be used for growing plants for the spring field

crops of Lettuce, Celeriac, Beets, Cabbage, Cauliflower, Tomatoes, Leeks, etc. The one big crop in the frames in the spring is Lettuce. The plants for this crop were started in frames about October 1st and are now almost three inches across, waiting to be set in the frames in February and early March. The plants which are to be set in the open field the last part of March, are now about the size of a silver dollar. The seed for the outdoor spring Lettuce is planted about November 1st.

The Lettuce plants are set during February, in rows 11 inches apart, with seven or eight plants to a row. Some growers will set every other plant, in every other row, with a Cauliflower plant. Then the Lettuce will come out during April or early May, and the Cauliflower will be ready to cut during the first of June. When Cauliflower is not used as a companion crop, Carrots, Leeks, etc., may be sown between the rows. When the Carrots are two inches high, they should be thinned out for quickest and best development. They ought to be ready to pull in early June.

During February, the Beet seed is sown quite thickly in frames in rows five inches apart. This crop must never get a severe chill, because this will cause the plants to bolt to seed. When the seedlings are four inches high, they should be cooled down, so that they will be able to stand the weather when transplanted to the field.

The ventilation of the frames is accomplished by sticking little pieces of mason lath, three inches long, under one edge of the sash with the little block resting on the edge of the next sash. These little pieces of lath are especially fine, because they permit of three openings, one-quarter inch, an inch and a quarter, and three inches. The pieces can lay anywhere on the sash without breaking the glass, even when the sash are piled upon one another.

On very cold nights straw mats, or better yet salt hay mats, are laid upon the sash where the more tender crops are growing. The double glass sash are not popular, because they are too heavy and become dirty inside and the crops grow more slowly under them.

Clean culture in the beds, and cleanliness all around the frame yard, are a big help in preventing infestations from injurious insects and plant diseases. Plant lice are usually destroyed with a high grade tobacco dust—applied when the foliage is dry. Last spring snails proved to be quite destructive to the spring crop of Carrots between the Lettuce. We found that the most successful way to fight them is to take off the mats suddenly in the morning, immediately lift the sash and catch the snails while feeding. The snails soon get under cover when the light comes, therefore, quick action is necessary. Air slaked lime distributed around the beds, and especially heavy along the boards, should be very effective in destroying the snails as long as the lime is kept dry.

Damping-off and mildew are effectively prevented by proper ventilation and good cultural methods. Coal ashes, sand or lime spread over the soil is beneficial in preventing these diseases.

During the last year the market gardeners have made big profits out of their frame crops. Last spring they had wonderful crops of Lettuce at \$6.00 per barrel. I saw heads so large that 36 filled a barrel. Between the holidays the gardeners were tying the little bunch Carrots, four Carrots to the bunch, and they sold for \$3.00 per hundred bunches. In fact, everything is selling at high prices. The work in the cold frames is hard, yet the gardeners have developed their methods so that a minimum of work is required for the amount of stuff produced. In most of the frames, the fall crops are about grown before the sash are put on; in the spring the sash are taken off sometimes before the head lettuce is cut, while the intercrop of Carrots, Cauliflower, etc., develops without glass. The use of mats is not so popular as it used to be, and they are used now only on the more delicate crops during the severest weather.

Our growers attribute much of their success to the home grown strains of seed which they have developed. They are looking forward to another very successful year, and I am sure they sent to the members of the Pennsylvania Vegetable Growers Association their very best wishes for a successful season.

R. W. DEBAUN, Market Gardening Specialist,
Agricultural Experiment Station,
New Brunswick, N. J.

SOME INSECT PESTS OF VEGETABLES AND THEIR CONTROL

C. H. HADLEY, JR., Extension Entomologist, State College, Pa.

During the past year, a number of insects have been reported as having caused a very considerable amount of injury to vegetables. In the following pages the chief points in the life histories of these insects are discussed briefly, with a consideration of the most practical means of control.

Cutworms

Cutworms are among the most troublesome insect pests of vegetables. There are a number of species, all belonging to the family *Noctuidae*; they are the larvae of the medium sized, gray and brown mottled moths which are often found flying around lights at night. Both moths and larvae are active at night and remain hidden away from sight during the day time.

Almost all vegetables are subject to attack from cutworms, especially young plants just pushing through the soil, and newly set transplants. The injury is done at night, the larvae cutting off the plants just below, just at, or just above the surface of the soil; the wilted tops are usually left lying near the severed stems.

The moths of most species lay their eggs during the summer on weeds, grass stems, and in similar locations. After hatching, the young cutworms feed for a time, until the approach of cold weather forces them to seek hibernating quarters for the winter. At this time, their presence is seldom noticed. Usually the winter is spent in the larval stage, the half-grown larvae curled up in little earthen cells a few inches below the surface of the ground. In the spring they emerge from their snug winter quarters, and attack any green vegetable matter handy. Thus it is, that their presence is much more noticeable at this season of the year. After attaining their full growth, the cutworms pupate in the ground and later appear as fully matured moths. Some species have only one generation per year, while others may have two or more.

Control—Plowing infested land in the late summer, fall, or early spring, with frequent harrowing, is a very effective method of destroying large numbers of the insects. Not only are many killed outright, but also many are starved out, since these operations tend to keep down all vegetation.

For use on a large scale, the poison bran mash is the standard remedy for cutworms. Poison bran mash may be made by mixing together 25 pounds of ordinary bran and 1 pound of Paris green. Then mix 2 quarts of cheap molasses with about $3\frac{1}{2}$ gallons of water, and moisten the bran with this solution. Just enough of the liquid should be used to make the mash crumble readily in the hand after squeezing a handful of it; it should not be too sloppy. The poisoned mash may either be scattered broadcast over the infested field several days before the new crop is to appear, or it may be placed around the individual plants in small heaps. In either case the material should be applied very late in the afternoon or in the early evening. Chickens should not be allowed to range on a treated field.

Strips of paper, about 2 or 3 inches wide, may be wrapped around the stems of the plants, the lower end of the paper cylinder going down $\frac{1}{2}$ inch or so below the surface of the soil and projecting about 2 inches or so above. When only a comparatively few plants are to be protected, this method will be found quite effective.

The Imported Cabbage Worm

The imported cabbage worm (*Pontia rapae*), more commonly known as the green cabbage worm, is a heavy feeder on the leaves of cabbage and related plants. The worm is light velvety green in color, with a very faint yellow stripe down the back, and is about an inch and a quarter long. Its parent is the familiar white butterfly seen flying around fields and gardens from early spring until late fall; the tips of the forewings are black, and the female is further characterized by the presence of two black dots near the center of the forewing, the male having but a single black dot.

The butterflies emerge very early in the spring, and lay their eggs on the leaves of any available plant food near by. The eggs hatch in a few days, and the larvae feed vigorously. The larvae

become full grown in about two days, and form a cocoon or chrysalis, which is attached to a leaf or other suitable support by means of a silken thread about the center. There are several generations during the season, and the pupae of the last summer generation hibernate during the winter. The spring butterflies emerge from these over-wintering chrysalids.

Control—Spraying the cabbage plants with arsenate of lead, at the rate of 3 pounds of the paste material to 50 gallons of water, will usually prevent injury from this insect. As cabbage leaves have a decidedly waxy surface, it is well to use some "sticker" in the spray solution to make the poison adhere more readily to the leaves; ordinary molasses, at the rate of $\frac{1}{2}$ pint to a gallon of spray solution is a satisfactory sticker. Soap may also be used for the same purpose, at the rate of about 2 pounds of ordinary hard soap to 50 gallons of spray material.

A salt solution is used by some growers with marked success. The plants are sprayed several times during the season with a salt solution, containing about 5 pounds of salt to 50 gallons of water.

Aphis (Plant Lice)

Plant lice constitute a very serious pest on a number of vegetables. Among those species of chief interest are the cabbage aphis (*Aphis brassicae*), the melon aphis (*Aphis gossypii*), and various others. These insects usually cluster on the under side of the leaves, and cause a curling and yellowing of the leaves. They are sucking insects, and suck out the juices of the plants.

Most aphids are soft bodied, usually greenish in color, and there are both winged and wingless forms. Usually the winter is passed in the egg stage, the eggs being deposited late in the fall, on refuse plants, or other convenient places. They hatch in the spring into "stem mothers," which at maturity give birth to living young. Reproduction goes on during the season very rapidly, the number of generations being produced depending upon climatic conditions. The last generation in the fall produces both males and females, which mate and lay the overwintering eggs.

Control—Plant lice are among our hardest insects to combat, owing to their great numerical increase during the summer and their inaccessibility, as they feed chiefly on the under sides of the leaves. Since they are sucking insects, a contact poison must be used, such as soap solution or tobacco solution. The soap solution is used at the rate of about 1 pound of hard soap to 4 or 5 gallons of water. The tobacco extract is used at the rate of $\frac{3}{4}$ pint of the concentrated extract (containing 40% nicotine), to 100 gallons of water, with about 5 pounds of soap added to make the solution spread better. There are on the market several different makes of tobacco extract, manufactured by different companies, under such names as "Black Leaf 40," "Nico-sul," etc. The chief factors in the successful handling of the lice problem are timeliness and thoroughness of application—spraying early, as soon as the infestation first becomes evident, and being careful to direct the spray at the insects so as to actually touch them with the material.

Cucumber Beetle

The striped cucumber beetle (*Diabrotica vittata*), is probably the most serious of the insect pests of this crop. The cucumber beetle also attacks such related crops as squash and melon. Not only does this insect cause a considerable amount of injury through its habit of eating the stems, foliage and fruits of these crops, but it is also thought to be the chief distributing agent of "curcubit wilt," one of the worst bacterial diseases of cucurbits.

The beetles usually appear during April and May; as soon as the young cucumber plants appear, they are immediately attacked. Eggs are laid on the host plants, as a rule, soon after they are well up. The larvae usually remain about the base of the stalks, below the surface of the ground, feeding on the roots and stems. Towards the end of the season, the adult beetles often congregate in numbers under the plants. The winter is passed in the adult stage and as the cool nights of fall approach, the beetles seek sheltered places in which to spend the winter.

Control—It is not always a simple matter to control these insects. If it is a question of dealing with only a comparatively few plants, satisfactory protection may be obtained by covering the young plants with light barrel-hoop frames covered with cheese cloth. Thorough spraying with arsenate of lead and Bordeaux, repeated several times during the season, will usually give fairly satisfactory protection. 4-4-50 Bordeaux with arsenate of lead at the rate of 3 pounds of the paste to 50 gallons of solution is the material used. Dusting the plants with a repellent, such as air-slaked lime, will also help. Clean cultivation and the destruction of crop remnants and other suitable hibernating places is important.

Squash Bug

The squash bug (*Anasa tristis*), is a very familiar insect in the garden. It is so well known that no further description seems necessary. The adults hibernate over winter, hidden away in rubbish, under boards or stones, dead vegetation, or in any other suitable situation. This insect is also known to be an important agent in the spread of "curcubit wilt."

Control—This insect is very resistant to insecticides. Very young bugs may be killed by a strong kerosene emulsion spray, but the older bugs will seldom be affected. Repellents, such as air-slaked lime, are partially effective. Trapping the bugs early in the season is of much assistance in preventing serious loss. Bits of boards, shingles, or similar material which will afford shelter over night, may be placed near the plants. Each morning these traps should be examined and bugs found under them killed. Consistent spraying with Bordeaux will afford some protection, and destruction of crop remnants and other hibernating places is important. Other methods may suggest themselves, according to conditions.

Spinach Leaf-miner

Large irregular-shaped blotches on the leaves of spinach, beets and related plants are usually caused by the spinach leaf-miner (*Pegomyia vicina*). The parent insect is a small two-winged fly, resembling the common house fly, but only about half as large. The female fly places her eggs on the lower side of the leaves, and as soon as they hatch, the young maggots bore into the leaf; they work around between the upper and lower surfaces, causing the conspicuous blotch-mines on the leaves. When full grown, they desert the leaves and pass through the pupal stage under fallen leaves or in the ground, finally emerging again as flies. There are several generations a year, the last in the fall hibernating in the pupal stage.

Control—There is no satisfactory way of preventing injury from these insects. In gardens, the infested leaves may be picked off and burned. Where beets are grown commercially, spinach is often used as a trap crop. As soon as a crop is removed, the ground should be plowed deeply and thoroughly harrowed. It is advisable to practice a rotation of crops where injury has been severe.

Bean Weevil

The bean weevil (*Bruchus obtectus*), is one of the worst pests of dried beans in storage. Although the initial infestation of the beans takes place in the field during the growing season, the first evidence of infestation is usually in the stored seed. Many infested beans have round holes in them from which the adult beetles have emerged, and in others the grubs will be at work inside.

The bean weevil is about one-eighth of an inch in length, covered with a fine brownish-grey and olive colored down, which gives a mottled appearance to the body. The wing covers are slightly shorter than the body. The eggs are deposited upon or inserted in the pod during the summer, in the field. The eggs soon hatch and the grubs burrow down into the beans; thus the beans are already infested when placed in storage. While the beans are in storage, the grubs continue growth. In ordinary storage, the temperature conditions are very favorable to the continued development of the insects, and we have successive generations, resulting in the beans becoming badly infested throughout. When the infested seeds are planted the grubs continue to develop and the new crop becomes infested.

Control—Weevil-infested beans should not be planted, since their vitality will be greatly reduced and many will not germinate.

Where it is possible, subsection of the infested beans to a temperature of 145° F. will kill all stages of the insect, without injuring the germination of the seed. The beans may be placed in an oven, having the required temperature, and kept there for about 6 hours.

Fumigation with carbon-disulfide (CS₂), is the most commonly used method of treating infested seeds of any kind. Carbon-disul-

fide is a liquid, which passes off as a gas upon exposure to the air. The gas has a disagreeable odor, is heavier than air, and is fatal to insect life. It can usually be purchased from druggists. The dose is from 1 to 2 pounds to 100 cubic feet of space, depending upon the seriousness of the infestation. The infested seed should be placed in a tight box, barrel, or similar receptacle, filling the receptacle to within not more than 4 or 5 inches from the top. The carbon-disulfide (amount to be used depending upon the cubic contents of the receptacle), may either be in a dish of some sort placed on the seed, or it may be poured over the surface of the seed, and the receptacle covered tightly. Old blankets placed over the top will keep the gas from escaping. Leave for at least 24 hours. As this gas is highly inflammable, extreme care must be taken not to bring fire or flames of any kind near it. After removing the covers, air out the receptacle in order to dissipate any remaining fumes of the gas.

Root Maggots

Root maggots are among the most common and serious pests of vegetable crops. The species usually present are the cabbage maggot (*Phorbia brassicae*), which also attacks such crops as cauliflower, radishes, turnips, and beets, and the onion maggot (*Phorbia cepetorum*). Since the life histories of both these pests are essentially similar, only that of the cabbage maggot will be discussed.

The insect passes the winter chiefly in the pupal stage; most of the pupae are to be found from two to three inches below the surface of the soil, close to the roots of the plants on which they have been feeding. Often they may be found on old cabbage stumps left in the field. In the spring the pupae change to two-winged flies, which usually emerge during the latter part of April or early May. Emergence does not take place all at once, but the flies will be emerging for a period of several weeks. Eggs are deposited in a few days, usually just at or below the surface of the ground on the roots, and they hatch in from three to five days. Under ordinary conditions, the larvae feed for about three weeks and then change to pupae; they remain in this form for about two weeks, after which the flies again appear. There is usually two or three successive broods during the season.

Control of Cabbage Maggots—The most effective means of preventing maggot injury to early cabbage is by the use of tar-paper disks—small, hexagonal pads or collars of single-ply tar-paper. These disks are cut with a slit from the edge to the center and shorter slits about the center so that they can be closely fitted about the stem of the plant, and pressed close to the ground. These pads should be applied when the plants are set in the field. The flies will then be unable to reach the roots by crawling down the stem, or along the surface of the soil.

Growing the seedlings under cover will prevent infestation of the seedlings by maggots. The bed in which they are grown should be covered with cheese cloth, of about 20 to 30 threads to the inch,

before the plants appear. The edges should be attached tightly to the board sides of the bed, so that no flies will be able to get into the bed to deposit their eggs. A few days before transplanting, the cheese cloth may be removed in order to harden the plants. If examination of the earth about the plants shows that eggs are being laid, the plants should be set at once, shaking off the eggs with the soil.

Removing old stumps after the cabbages are harvested, is of importance, in order that they may not provide food and suitable hibernating places for the winter, for any maggots present.

Control of Onion Maggots—The most promising method of controlling these pests is by means of a poison bait spray. This has been tried in several other states and gives promise of being fairly satisfactory. A poisoned bait consisting of 5 grams of sodium arsenite dissolved in one gallon of boiling water mixed with one pint of molasses, is applied as a coarse spray of large drops once a week in strips across the onion field, throughout the summer. This method is well worth trying where maggot injury is serious.

Destruction of infested onions and removal of crop remnants is also important. Rotation of crops, substituting a crop not subject to maggot injury, will result in starving out the pests.

GREENHOUSE VEGETABLES—HOW TO GROW THEM

W. H. WEINSCHENK, New Castle, Pa.

In growing vegetables in greenhouses, obstacles are encountered which do not occur in open field culture because of abnormal conditions often created. And yet, when proper and intelligent care is taken, there are no better facilities afforded for the control of the essentials in plant development. Moisture, temperature and fertility can be regulated to suit the requirements of the crops.

It is true that troublesome insect pests and diseases have to be combatted, but it is also a fact that after having acquired a knowledge of the causes and conditions leading to these troubles, fortunately, many are preventable by taking precautionary measures. I shall touch upon these measures when taking up the culture of the different crops.

Lettuce, Cucumber and Tomato are the most important crops grown in the New Castle district, while radishes, parsley, spinach and celery are of minor importance.

Greenhouse lettuce stands in a class by itself because of its superior quality; and could it be grown during the hot summer months, would sell in preference to the field grown article at all times and at an advanced price. For the first crop, seeds should be sown about August 1st, preferably in a cold frame, replacing the sash and covering with mats to facilitate germination. The seeds will come up very quickly at this season of the year, care should be taken to remove the mats as soon as germination has taken place and to provide plenty of ventilation.

When seed leaves are fully developed, remove the sash entirely. The seedlings develop rapidly and should be transplanted at once in finely prepared soil, one and one-half inches apart each way. It pays to transplant. It makes strong, stocky, even-sized plants and shortens the time required to mature a crop. These are distinct advantages. The plants should be ready to set in the bed of the houses about September 1st.

In preparing soil for transplanting, the soil should be thoroughly saturated with water. Let me emphasize this by saying it should be *drenched*. This is simply nature's method of preparing soil for successful plant growth. Failure to do this is a fruitful source of heavy losses due to diseases commonly called "rosette." I believe if this detail is properly attended to it is possible to grow lettuce successfully without sterilization. The soil should be left standing until in good working order; then it may be spaded or plowed and a liberal application of rotted stable manure incorporated. Before raking, it is desirable to make an application of lime, either the caustic or the ground lime stone.

Our usual method is to mark off the bed in 8 inch squares, but I find it best for the first planting in the fall, when the temperature is high to give more room, say 10 by 12 inches, which induces a more stocky growth. After being set, the plants should be given a good sprinkling and watered at intervals thereafter. At this season of the year when no artificial heat is required, the ventilators should be kept open day and night. When the temperature does drop below 45 to 50 degrees F. by night and 65 degrees by day, artificial heat should be maintained.

For the second crop, ample provision should be made for plants during October and November, because they grow very slowly during the short, dull days of winter. During the months of December and January there is often a marked shortage of plants. The frames cannot be depended upon any longer and so a supply must be provided by sowing seeds in flats, from which plants should be transplanted into suitably prepared beds when quite small. Before planting the second crop in the permanent bed, the soil should be wet down sufficiently to make it moist throughout. If properly attended to this will ordinarily give ample moisture for the crop without much spraying.

Not infrequently, in this second crop of lettuce, all sorts of trouble develops because of continued cloudy, sunless days for considerable periods at a time. The temperature will often be about right without artificial heat and, as a matter of economy, the starting of the fires is postponed. This will invariably cause fungous diseases to develop. It undoubtedly is strict economy to supply heat at such times and keep the ventilators open to prevent too high temperatures. The rose grower never lets his fires go out and always supplies heat during damp chilly weather, thus keeping the atmosphere more or less dry. The vegetable forcer needs to follow this plan more or less closely. Ventilation will have to be attended to carefully during this period, and plenty of air admitted during bright mild weather.

The third crop of lettuce is started with the spring crop of cucumbers or tomatoes, and will develop very fast on account of better weather conditions and higher temperatures carried to bring on the cucumbers and tomatoes. We plant cucumbers in rows, 4 feet apart and tomatoes $2\frac{1}{2}$ feet apart. Lettuce is planted in this space up to within 12 inches of these rows. This crop of lettuce is not up to the standard, but is inclined to be somewhat spindly and drawn on account of the extra heat for the other crop.

In order to control the aphids or green lice, it will be necessary to fumigate regularly about once a week with tobacco stems well moistened. Should the lettuce become badly infested it will be necessary to fumigate two or three nights in succession. Care must be taken not to get it too strong or the leaves will be burned, having the appearance of being frosted. Experience will show the right amount of stems to use. Begin with light fumigations and carefully observe results as increased quantities are used.

Cucumbers for the early spring crop should be started early in January. Seed may be sown thickly in flats and placed where there is a vigorous heat, sufficient to start the plants in three or four days. They should at once be potted into 2 or $2\frac{1}{2}$ inch pots and again placed where a high temperature can be maintained. Supply at all times an abundance of water. They may be transferred again to 4 inch pots, but we usually keep them in the small pots 5 or 6 weeks, when they are set in the bed with the final crop of lettuce. Just as soon as the lettuce has been removed the cucumbers will be ready to vine. As supports for the vines we use suspended wires. The first three or four laterals are removed, and after that the ends of all the laterals are cut off—after two or three fruits have set.

Cucumbers require a uniform temperature of about 65 degrees at night and 80 or 85 degrees during the day, also an abundance of water. The ventilation must be carefully attended to, especially during damp cloudy weather. The red spider becomes troublesome at times, but may be held in subjection by using water from the hose under pressure to the under side of the leaves. What is known as the "stink bug" is perhaps the most destructive pest to the greenhouse cucumber. When they appear in any considerable number, the vines will soon commence to wither and die. The only remedy seems to be hand picking. In order to grow cucumbers successfully, it is necessary to sterilize the soil with steam, to destroy the "root knot" organism which causes a development on the roots resembling club root. It is absolutely necessary to pollinize the blossoms by means of bees.

Tomatoes should also be started in January similar to cucumbers, but do not require so much heat. When the seedlings are well developed they should be transplanted and then potted the same as cucumbers. These potted plants are then set with the last crop of lettuce. When the lettuce is harvested, a piece of binder twine is suspended from a wire overhead, tied to the base of the tomato plant and used as a means of support. All laterals should be re-

moved when very small. Artificial pollination will have to be resorted to, and should be done at least three or four times a week by tapping the top of the blossoms gently with a light stick. The pollen is thus visibly expelled. During May and June simply shaking or jarring the plants will suffice. Mildew or leaf mold is prone to develop, but if heat is kept up during damp weather and cool nights it may be warded off considerably. After the fruit has set, it is found to be beneficial to supply a coarse strawy manure mulch to the beds 3 or 4 inches deep. This will force the crop ahead and conserve moisture. Tomatoes require an abundance of moisture at times and, unless this is attended to faithfully, blossom-end rot will develop, resulting in serious loss and a light crop. Steam sterilization is also recommended the same as for cucumbers.

Parsley is easily grown and the best way perhaps is to put soil into 2 or 2½ inch pots, firm it well and sow 5 or 6 seeds in each, sometime in July; or the ground may be marked off the same as for lettuce and seed put in the check rows and well firmed. Parsley is slow to germinate and requires constant spraying until the plants are started, when they should be thinned.

Radishes should be sown in rows about 4 inches apart, and thinned to about one inch. Celery is scarcely to be considered a success commercially. For a spring crop, seeds are sown in January and treated very much like lettuce. It succeeds very well but no attempts have been made to grow it to any extent. From experiments during the past year, I believe an early winter crop of the green varieties may be successfully grown if planted in September. The Golden Self-Blanching is not suitable for a winter crop. New Zealand Spinach is being grown to some extent. It is planted in rows and affords continuous cutting at profitable prices, usually bringing the same price as lettuce.

MARKETING GREENHOUSE VEGETABLES

F. J. Zuck, Erie, Pa.

Mr. Chairman: In the past, the marketing of greenhouse vegetables has received very little study. The grower has rested content to get rid of his produce with no regard as to its possible condition when it reached the consumer. A wonderful advancement has been made in the growing end of the greenhouse business but little in the marketing end.

I wish to consider, briefly, some of the faults of the present day methods of marketing and to give a little of our experience in trying to solve them.

In Toledo, leaf lettuce is packed in barrels. This package is cheap and is a good protection, in winter, against freezing. It is too large, however, to be the ideal package. The barrel must be re-packed once or twice before reaching the retail store. The result is, the lettuce is more or less broken up and there is considerable shrinkage.

In Cleveland, leaf lettuce is packed in a ten pound basket. This is a step in the right direction, because the original package goes to the retailer mostly without being broken. The commission man or wholesaler can sell on a closer margin because he has no shrinkage, and the stock goes to the retailer in better condition. The package is too large, however, because few dealers can sell ten pounds, especially in winter, before becoming dried out and stale. In some places, five pound packages are used. This is better but it still seems a little too large.

The package used in the Pittsburgh market is a basket containing three pounds of lettuce net. This approaches the ideal, in that the retailer can purchase a small lot of lettuce in the original package. It seems, however, that the package itself could be improved upon. The lettuce is packed in the basket very loosely, and must become more or less jumbled up in the course of several rough handlings. The basket is lined with straw paper which absorbs the moisture from the lettuce and dries out in a short time. The baskets are also covered with straw paper which is very easily broken and, unless they are very carefully handled, affords poor protection to the contents. Would not something like a small, waxed, pasteboard carton be better?

Let us follow, briefly, the fate of a lot of lettuce that gets into a retail store. The retailer receives it fresh sometimes but many times after it has been in a wholesale store for some time. It is placed on the counter. After a few sales the top is usually covered with leaves and broken heads, and about the second day it presents a decidedly unattractive appearance. Buyers have been seen to approach the lettuce display, and with a look at broken heads and wilted leaves, pass by. The retailer is not willing, of course, to throw this stock away and get fresh. He works it off after some time to those who must have it, and with some, fills telephone orders. Of course, this does not mean that the buyer never gets good lettuce. It does mean, however, that too many times the buyer is dissatisfied.

The same is true of other vegetables. What is more attractive than a fresh bunch of radishes, a fresh green cucumber or a fresh bright tomato. On the other hand, what is more unattractive than a wilted bunch of radishes, a stale dull colored cucumber or an aged tomato. If every buyer that went into a store saw a stock of nice fresh vegetables, and if every telephone order was filled with fresh stock, it is safe to say the demand would be increased many per cent. The speaker was told not long ago by a woman, that she always used head lettuce because she never could be sure of getting fresh leaf lettuce.

When the winter vegetable growers learn to use scientific methods in the distribution and selling of their goods, as is done in other lines of business, there will be a new impetus to the vegetable forcing business. Two incidents that occurred not long ago will help to bear out this contention.

A Domestic Science teacher had occasion not long ago to take dinner with one of our neighbors. Lettuce was on the table that had been gotten fresh from our houses. The lady, after eating some of it, asked where it came from saying it was the best she ever ate. She went on to say that lettuce was very beneficial in a person's diet, and that she would like to recommend its use more than she did, but that people could not get it fresh.

We sent a basket of lettuce to a friend in New York City some time ago. He wrote back saying he was very much surprised to find the so-called leaf lettuce so good. He had always been led to think with every one else that leaf lettuce was very much inferior to head lettuce. There would undoubtedly be an immense market for Grand Rapids lettuce in the large eastern cities if the consumer could be given fresh goods and educated to use them.

Greenhouse vegetables are not given the publicity that they should be given. They are too many times placed on the counter in an inconspicuous place, with nothing to draw attention to them. The result is the housewife rarely has the using of them suggested by any advertising scheme. Other lines of business spend good money for advertising and profit by it. Why would it not pay in our line? It seems safe to say that when the greenhouse grower keeps before the housewives by means of newspaper advertising and store displays, setting forth the benefits of using vegetables in winter, there will be a new impetus given to the growing of winter vegetables.

Our experience in trying to solve this problem may be of interest. One scarcely ever goes to a retail store and asks for an article of food without getting it in the original package. The tendency today is to put up food in small packages that go to the consumer unopened. This is sanitary and the retailer can sell closer, because there is no shrinkage in weighing.

The idea came to us, why cannot the same be done with lettuce? We tried wrapping lettuce in one pound packages with parchment paper, but found that the pound made too large a package. Few people bought more than a half pound at a time. The parchment was not satisfactory as it did not hold the moisture on the lettuce. It was suggested to us to use paper cartons but we found that these would cost too much. The idea then came to us to wrap one-half pound of lettuce in a waxed paper such as bread is wrapped in. This was tried and found to suit our needs. Many dealers like this package very much and will pay extra to get it. The difficulty, is, however, to get it to the consumer fresh. The dealer will many times hold the stock too long and it will go out in bad shape. The problem is difficult of solution but we believe it can be solved if up-to-date methods are used.

We heartily believe that when greenhouse vegetables are advertised as many other commodities and when the housewife can always get fresh stock, the winter vegetable forcing business will experience remarkable growth.

EXPERIENCES IN SUPPLYING A LOCAL MARKET

W. H. EVANS, Plainsville, Luzerne County, Pa.

By way of explanation I will say that my experiences have been confined to the Wilkes-Barre market which I have helped to supply with produce ever since a boy. It is almost entirely a wholesale market, there being very little retailing or jobbing. Grocers, peddlers, and other retailers buy direct from the growers.

For a number of years we have had a curbstone market under city control. When I first started to market we used the Public Square, where all the farmers came to sell their produce, including cattle and hay. When the street car lines were electrified, the mayor and council made a present of the Square to the Traction Company and the farmers were told to vacate. They finally located in a stable yard with accommodations for 45 producers' wagons but none for those who came to buy. Conditions grew worse and business increased. In a few years our city became one of the third class and there was a change in government. A mayor was elected who was willing to listen to the demands of the farmers and we soon had a curbstone market, the one used at the present time. We pay the city ten dollars a year for a team or five dollars for a one-horse wagon for a stand. Farmers who come occasionally, take stands allotted to them daily and pay 25 cents for a team or 15 cents for a horse daily. My advice to you men who are doing business in public markets is—see to it that your rights are guarded. If we had been on the job we would not have lost our public market in the first place, and it took a long uphill fight to get it back again.

One of the most interesting phases of marketing is the people with whom you do business. When I first started in business our customers were chiefly Americans, Germans, Irish, Scotch, Welsh and Jews. Later we had an influx of Hungarians, Polish, Slavish and other kindred races. Then came Arabs and Turks and still later the Italians. But all the time we had the Jews, who are like the poor mentioned in the Bible. We did not know what dealing was, however, until we encountered the Arabs and Turks. These oriental people do not seem to understand that it is possible for a dealer to have one price, and so they try to bargain for each article no matter how small the purchase. Nearly all of these future citizens are born thieves, and make stealing a part of their business. It may be a bunch of celery, a bushel of beans or a bushel of potatoes.

There has been a gradual change in the kinds of vegetables we grow for our people. Years ago the roots, cabbage and corn were our principal crops. Tomatoes gradually became popular. The demand for celery has also been a gradual development and now is one of our chief crops. About 200 acres are grown each year for our market and there is still plenty of demand as a rule. Since the Italian has come, it pays to grow mangoes or sweet peppers. They are large consumers of this fruit—single families frequently buy them in barrel lots. The demand for this crop from other people is also increasing.

The population of our city has grown from about 23,000, when I began to sell produce, to 75,000. Wilkes-Barre is also the market center of a population of about 250,000. But the vegetable growing business has increased much faster than has the population. This has been due largely to the fact that the high price of meats has forced the people to consume more largely of other foods. The value of vegetables as food is also being appreciated more and more each year.

It generally pays to grow the best quality varieties, but there are some exceptions. Golden Bantam corn is a good seller with a certain trade, and if the supply is limited it sells all right, but the larger part of our trade wants a larger ear. With peas it is the same way. We can make more money on some varieties that bear well, than from the high quality peas. The only variety of late cabbage that sells well is Danish Ball Head. Good appearance sells better than high quality. When White Plume celery was first introduced into our market, it took everybody by storm. You could not sell anything but the self-blanching varieties. The people have now swung back to the Green varieties, and any of the self-blanching sorts are slow sellers when there is green celery on the market. Therefore, study your market and grow what it wants. It is possible to educate the people to demand better quality, but, as a rule, it is an expensive proposition.

We find that it pays to pack vegetables in neat, clean new packages. Onions bunched in bundles of 25 sell better than they do loose. Peas and beans sell better in baskets than in bags.

It pays to be honest and to treat your customers fairly in this business as well as in any other. If a man buys a bushel see to it that he gets what he pays for. And do not be afraid to ask as high a price as you think you can get, because there are times when you have to sell at a loss. I have seen potatoes sell on our market for 10 and 20 cents a bushel and few buyers. Is the farmer to be blamed for getting \$2.00 when he can? Last season late cabbage sold for \$3.00 a ton. Do you blame the grower for asking \$60.00 this year, if he can get it?

I think it is a mistake in this State to sell goods on commission unless you know absolutely that your commission man is honest. Whenever possible, sell your goods and get the money before they get out of sight. Also, remember that "book accounts" pay no bill. Do a cash business.

A great deal has been said this year about high prices. Much of the scarcity has been due to the very wet season together with the shortage of farm labor. On account of the shops and munition plants it was impossible to get help as needed. But the era of high prices is just beginning. Miners work under an 8-hour law; there is an 8-hour law for railroaders; carpenters, bricklayers, and most machinists work only 8 hours a day. When the time comes, and it will not be long, when the farmer works only 8 hours, the prices the public will pay will be something to talk about. There is absolutely no reason why the farmer should work 16 to 18 hours a day to supply the rest of the community with a cheap living.

SOME MARKETING PROBLEMS

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During our present great prosperity, which is being shared by all those who have farm products for sale, some of us are inclined to feel that we have no marketing problems to worry about. I believe the Pennsylvania vegetable growers are sharing in the present high prices which all fruits and vegetables are bringing, and possibly feel that their marketing problems are not very great at the present time.

The prosperity of which I speak has spread to all industries in this country, but in spite of it, hard-headed manufacturers are looking ahead. Preparedness is the keynote of the day. It is not likely that our present business boom will last indefinitely and manufacturers are taking measures for the stabilizing of their business and are building for its future.

It is perhaps more difficult to build a stable business in fruits and vegetables than it is in a manufactured article. However, prosperity can best be reached in the long run by building a business which will be continuous. This is as true in vegetable marketing as in any other business.

I understand your association is comprised of two classes of growers, those who do a local business hauling to nearby markets, and those who ship to distant markets. These two classes of growers have somewhat different problems, but they have one great problem in common, and that is the standardization of their products. Successful business can be built only on giving the customer what he wants, when he wants it, and this can be accomplished only by giving him a standard article. The standardization of food products is a big problem and leads back to the growing processes. Some of the large organizations, such as the California Fruit Growers Exchange, have realized this and have established a field service department. The members of this department go out on the farms of the growers and instruct them in methods of growing which will enable them to produce a standard article. I will not discuss cultural methods but merely wish to say that cultural methods must be studied when standardization is considered.

Some growers say that it is impossible to standardize in the East as products do not grow as uniform as in the West. If some of you had seen the size of some of the western cull piles of cantaloupes that I have seen, you would realize that the westerners also have their problems in trying to produce a uniform high grade article. Some eastern growers have adopted standards to very good advantage. I heard the other day of a Long Island potato grower who had forty acres of potatoes, which he graded, and realized \$1,000 more for his crop than a neighbor who had similar quality,

realized on a similar amount which he sold ungraded. If the buyer is able to depend upon your goods you can build a stable trade.

In addition to standardizing products, it is necessary to bring this dependable article to the attention of the trade. A distinctive mark on a package, such as a purple hoop on a basket or red stave in a barrel serve to draw attention of buyers to superior articles. Some Michigan grape growers that I know have done this, claim it pays to advertise in grapes as well as in breakfast foods.

Standardization of packages is also desirable. There are at present a large number of local packages in use which are known only in one market. The use of such packages restricts the outlet of the grower using them.

You may be interested in the work that some of the vegetable growers in other parts of the country have done in organizing their local market conditions. In Providence the market gardeners, after putting up for many years with inadequate space in which to sell their goods, have organized an association and have opened a market of their own. They bought five acres and laid out a well designed city market, where their members can now sell their produce in comfort without the crowded conditions that formerly prevailed, and at a net saving to their members of \$40 per year in stall rentals. This association is rapidly paying off the indebtedness on its land and is in a prosperous condition.

In St. Louis there is a co-operative movement which is even more ambitious. The market gardeners in St. Louis were also unable to secure satisfactory conditions for the marketing of their produce. They organized an association and have bought eight acres of land, in a very good location, at a price of \$145,000. They are putting up a model market; are renting stands at \$50 per year and have the enthusiastic support of their members.

These moves have been accomplished only by co-operation. In the East, some of us have not learned the true meaning of co-operation, but what has been accomplished in these two cases shows that co-operation has a place in the East as well as in the far West.

While the problems of the vegetable grower are mostly local problems, we believe that it is well for growers to have more than a purely local grasp of marketing conditions in this country. At times a local market may not be the best one in which to dispose of products. An agency now exists which can assist you in getting a national viewpoint of marketing problems. I speak of the U. S. Office of Markets News Service, which was established last year for the purpose of supplying information to growers and shippers on marketing conditions throughout the entire country. Briefly, through this service, information can be secured as to the condition of the various larger markets throughout the country on certain of the more important fruits and vegetables. A telegraphic report is issued every day, showing the jobbing prices prevailing on some twenty or more of the largest consuming centers in the United States.

A copy of this telegraphic report will be mailed free to any grower desiring it from our nearest branch offices. Branch offices which are located closest to points in Pennsylvania are Baltimore, Philadelphia, New York City, Buffalo, and Pittsburgh. If you desire this report during the coming season, it will only be necessary to write to the Office of Markets in any one of these cities named and state on what crops you desire to receive the information.

In addition, the Office of Markets issues a monthly cold storage report on apples, butter, eggs, cheese, and meats which shows the stock of these commodities in storage at the end of each month.

Our office has been doing work on many other lines. For instance, it has made an investigation of the possibilities of marketing vegetables by parcel post. Farmers' Bulletin No. 703 has been issued and is available to all those who desire it and covers the best methods of marketing and packing by parcel post.

We have a project which deals entirely with grading and standardization and another project which deals entirely with city marketing problems; still another project deals entirely with co-operative organization work, another one with marketing business practice and another one with export markets. These different lines of work all touch, more or less, upon fruit and vegetable marketing activities and, in addition, the Office does much work with the more staple products. Investigations are under way in hay, grain, seed, dairy products, poultry, cotton and live stock marketing. In addition, the Office carries on certain regulatory work, such as the administration of the Cotton Futures Act, the U. S. Warehouse Act, and the U. S. Grain Standards Act.

We have a big field to cover and are ready to serve whenever it is possible. Our authority is limited by the Act of Congress to diffusing and disseminating useful information. Some people desire that we do more than this but it is impossible under present conditions. If you have any problems in marketing with which we can help you, we shall be glad to have you call upon us.

THE VEGETABLE GROWERS' SOIL AND FERTILIZER PROBLEMS

DR. H. J. WHEELER

Formerly Director of the
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It is safe to assume that the vegetable grower, especially if he possesses only a small area of land, will probably be under the necessity of using some stable manure, or he will at least prefer to do so. Nevertheless, it is possible where plenty of land is available to adopt a rotation of crops which involves keeping the land

in clover and grass for three years out of six, and if this is done, the use of stable manure though desirable, is not an absolute necessity. In fact, the soil can be built up quite rapidly by this means, as far as concerns its humus supply and general fertility, provided the land is properly supplied with lime, and suitable commercial fertilizers are employed.

The Care and Management of Farm Manure

At this point I ought to say something regarding the care and handling of stable manure. Where it can be hauled out and spread upon the land as fast as it is produced, the losses of plant food are reduced to a minimum, provided the ground is not frozen or covered with ice, and the slope is not too great. This practice is seldom feasible for growers of vegetable crops, unless they are operating on extensive areas and combine animal husbandry with truck growing.

Those who cannot haul out the manure as fast as it is produced will do best to preserve the liquid and the solid manure together. Provision should also be made, if feasible, for mixing the horse and cow manure. The manure in either case should be packed down as firmly as possible and kept moist. The packing is sometimes accomplished by allowing swine to work it over.

If horse manure is left in piles by itself, it is likely to fire-fang, with the result that most of the ammonia, or the most valuable portion, will be lost.

It often becomes a matter of economy, or necessity for the truck grower to pile manure in the field for some time prior to its use. In such cases, instead of having the pile built up so as to shed water, it should either be leveled on top or slope slightly toward the center, so that the water which falls upon it will enter the pile. Under such conditions, as well as when manure is compacted in the pit, a large part of the nitrogen in the liquid manure is changed into ammonia and is held in the manure, in combination with carbonic acid, as ammonium carbonate.

When manure has undergone this ammoniacal fermentation, it should be plowed or harrowed under as soon as it is spread, for if it is left upon the surface of the soil, exposed to the wind and sunlight, the ammonium carbonate decomposes quickly into ammonia and carbonic acid gas, both of which readily escape into the air. This is a very important matter to which our American farmers have heretofore paid but little attention, and yet it is of vital importance, for it affects their financial returns in a serious way.

If the grower has not enough manure to cover all his land at the desired rate, it is usually far better, unless local conditions—distance and cost of hauling—are prohibitive, to apply some manure on all of the land which is to be used for hoed crops, and to supplement the manure with fertilizer, instead of applying only manure, in large quantities, on certain fields and fertilizer exclusively on the others. This is for the reason that the manure promotes favor-

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able bacterial action. In the case of potatoes, however, excepting in times of potash shortage, it is usually preferable to use fertilizer exclusively, because of the tendency of the manure to promote the development of potato scab.

Manure is of special aid in holding moisture in the soil; it also improves its physical condition or structure, and it favors the activity of beneficial soil bacteria. These bacteria, though unseen by the grower, are, nevertheless, co-operating with him in the maintenance of such soil conditions as will insure the best action of the fertilizer and the largest production of crops.

In dealing with sandy and gravelly loams, or with soils which are exceedingly silty or clayey and have a tendency to bake, the introduction of organic matter in manure and in catch crops, cover crops, and similar material is of the utmost importance.

As the supply of manure from our towns and cities becomes more limited, growers of truck crops must pay more attention to these other means of maintaining the fertility and tilth of the soil. Already in the vicinity of several of our large cities, the dearth of manure, because of the substitution of motor vehicles for horses, is creating a serious situation.

Soil Testing and Liming

In order that the manure and fertilizer may exert their full effect, the grower of truck crops should first of all test his soil for the purpose of learning if it is in need of lime. Usually the agricultural experiment station, the agricultural college extension department, the teacher in some nearby agricultural school, the county agent, or some agricultural service bureau will do this without charge.

The grower can get a good idea, himself, as to the possibility of lime being needed, by using two or three very simple tests. In the case of soils which are not exceedingly red and sticky, one should add to half a cup of soil sufficient water to make it like the thickest sort of porridge. The mass can then be parted with a knife, a narrow strip of blue litmus paper inserted, and the soil pressed back against the paper. If, in half an hour to an hour the end of the blue paper which is in the soil has become intensely reddened, it is probable that lime is needed.

All kinds of soils, including those which are red and sticky can be tested in the following manner: Place a piece of red and of blue litmus paper, each approximately half an inch square, on the bottom of a plain glass tumbler, some distance apart. Over them lay a circular piece of ordinary filter paper such as can be secured at any drug-store. Place the soil on this paper to the depth of an inch or more, and add carefully just enough water to thoroughly moisten it throughout. Care should be taken not to add enough water so that it will stand on top of the soil after it is pressed down firmly, neither should drops of it appear to flow along on the bottom of the glass. It is very important that the soil be pressed down

uniformly and firmly. Any change in the color of the litmus paper can be observed through the bottom of the glass. One should usually wait two or three hours, or even longer, before deciding whether the soil is acid or not. This is for the reason that the reddening of the blue litmus paper does not take place as quickly when it is covered with filter paper as when it is brought in direct contact with the soil. The quicker and more intensely the paper is reddened the greater will be the probable need of lime. If the soil is already alkaline, it may turn the red litmus paper blue instead of reddening the blue paper. The test with blue litmus paper reveals acidity due either to the presence of acid organic matter or to the presence of acid mineral matter; hence it is applicable to both surface soils and subsoils. Good crops of most kinds can be grown on soils which are still slightly acid, or which very slightly redden blue litmus paper.

Another simple test has been devised recently by Professor Truog of Wisconsin, the equipment for which is now on the market.

The ammonia test of soils is often of supplementary value, but only in connection with surface soils. If a soil has contained enough lime and magnesia for some time, the addition of ammonia water will not dissolve from it any considerable amount of humus. If, however, there has been a great deficiency of lime and magnesia, and the soil is fairly rich in decaying vegetable matter, a reddish-brown, chocolate brown, or sometimes even a very black extract of humus is secured upon adding ammonia water to the soil. In order to make this latter test, place a rounded tablespoonful of soil in the bottom of a glass tumbler; fill it half to two-thirds full of water, and add 1 or 2 tablespoonfuls of dilute ammonia water. Stir the soil and liquid occasionally during the first hour and allow the glass to stand for a few hours. As a check, make another test using only water. Frequently very dark or black extracts will be formed in a few minutes; and if at the end of two or three hours the liquid becomes quite dark in color, it may be concluded that lime is needed.

You doubtless wish to ask what kind of lime one should use. If the soil is a light, sandy, or gravelly loam, finely ground limestone (carbonate of lime), is always preferable to burned lime, air-slaked lime, or hydrated (water-slaked) lime, and it is safer and far more pleasant to handle.

For use on clayey soils which bake readily, burned or slaked lime may be better than ground limestone, at least for the first application, since they flocculate the soil more quickly than the carbonate of lime. By "flocculation" is meant the uniting or bringing together of several small particles into a much smaller number of larger granules, which is something always to be desired in connection with such fine-grained soils.

Ground limestone should contain about 50 per cent of actual lime; slaked lime from 65 to 70 per cent; and burned lime from 95 to 98 per cent. For most soils an application of from 2 to 2½ tons of ground limestone is sufficient for a period of four to five years,

and subsequent applications may generally be limited to three-fourths of a ton to a ton to the acre. In the case of exceedingly acid soils of a heavier type, from 3 to 4 tons of limestone to the acre may be necessary at the outset, in order to secure the best results. Bearing in mind the percentages of lime in slaked and burned lime, it is easy to calculate how much less of them will be required to supply the same quantity of actual lime.

Whatever the form of lime, it is a good general practice to apply it after the land has been plowed; and if it is rough sward land, it should be harrowed once before the lime is sown. In all cases, the lime should be worked into the soil thoroughly, to a good depth, with a disk harrow. If one is using burned lime, air-slaked lime, or hydrated lime, it is especially important that it be harrowed in just as soon as it is applied, for if left over night or during a rain-storm, a good deal of it may become hardened, compacted, or get into a somewhat mortar-like condition, so that it cannot be incorporated with the soil in a satisfactory manner when the land is subsequently harrowed.

It used to be thought that plants having a sour taste did not need lime, probably because common sorrel, which is sour, grows well on acid soils; nevertheless rhubarb responds favorably to liming.

Potatoes thrive well on slightly or moderately acid soils, but if the acidity increases beyond a certain point, the yield of large tubers in particular will be greatly lessened. Since lime tends to create an alkaline condition of the soil which favors the increase of potato scab, all potato tubers used for seed purposes should be treated with formalin, or preferably corrosive sublimate solution, if planted on soil which contains much lime naturally, or which has been limed. In general, it is preferable to lime following the removal of a potato crop rather than just before potatoes are planted. Experiments made by the writer have shown that the germs which cause potato scab can live in the soil for eighteen years even though no potatoes are grown in the interim.

The Effect of Lime on Different Kinds of Plants When Grown on Acid Soil

There is a wide difference in the response of different kinds of plants to liming when grown on acid soils. Where the lima bean, for example, shows little or no benefit from the use of lime, the horticultural pole bean responds noticeably and the golden wax and greenpodded string beans are greatly benefited.

Practically all of the cruciferous garden crops such as the turnips, cabbage, cauliflower, Brussels sprouts, kale and kohlrabi respond well to liming if the soil is very acid.

Among the plants which are least able to withstand the conditions existing in very acid soils are upland cress, lettuce, spinach, beets of all kinds, onions, and cantaloupe; hence lime is very helpful to them.

While asparagus can be grown successfully on slightly acid soils the growth will be greatly lessened if the acidity increases beyond a very moderate degree.

The radish and chicory are plants which thrive well without lime, where beets and onions fail because of need of it.

As a soil increases in acidity, a point is soon reached where sorghum fails to thrive; this is followed in turn by barley, wheat, oats, rye and corn. In fact, most moderately or slightly acid soils will still give good yields of corn and rye and fair crops of oats, without the use of lime, yet it is advisable on such soils to use some lime for even these crops.

Blackberries thrive admirably on very acid soil, the black-cap raspberry almost as well, but the Cuthbert raspberry is more in need of lime. Strawberries should usually not be limed, and never heavily. The apple, and especially the peach and pear are less in need of lime than the quince, cherry, and plum, which, on very acid soil, respond to liming in a marked manner.

The pepper, martynia, pea and many other miscellaneous garden crops are greatly helped by liming.

Fertilizers Which Supply Nitrogen

When you read the analysis of a fertilizer, you will find a statement of the amount of ammonia or the amount of nitrogen to which the ammonia is equivalent. You should bear in mind, however, that 14 pounds of nitrogen are equivalent to 17 pounds of ammonia; hence if the percentage of ammonia is given, multiply it by .82, and it will give you the equivalent percentage of nitrogen. On the contrary, by multiplying the percentage of nitrogen by 1.21, you will find how much ammonia the nitrogen is equal to.

Nitrogen in fertilizer is derived from many different materials. The quickest and most immediately active are the nitrates, such as nitrate of potash and nitrate of soda. If nitrate of soda is used successively for several years on soils of a compact, clayey or silty type, plants remove the nitric acid more rapidly than they do the soda and the latter is changed into sodium carbonates. These deflocculate clayey soils, with the result that their physical character is seriously injured. On open, sandy and gravelly soils, injury of this character would not be expected. The nitrogen contained in nitrate of lime, which is now being made in Norway, is equally as efficient as that in nitrate of soda, but the material is dangerous to apply provided it gets into the eyes; and it absorbs moisture so rapidly that it must be stored in sealed tanks, and for the same reason it cannot be used with safety in ordinary fertilizer mixtures. Nitrogen in these forms passes freely through the soil, and much of it is easily lost from open soil by leaching, provided the rainfall is heavy. Because the nitrogen of nitrates is not held in the soil in chemical combination, only a part of the nitrogen in the fertilizer should be in that form. If the grower uses nitrates as the sole source of nitrogen, he should apply them periodically rather than

all just before planting, for otherwise if heavy rains occur there will be danger of serious loss. This is especially true of light, open soils having a gravelly or sandy subsoil.

The next most available source of nitrogen for plants is what are known as ammonium salts. The only one of these which is used to any considerable extent for fertilizer purposes at present is sulphate of ammonia, a by-product obtained in the manufacture of illuminating gas. If sulphate of ammonia is used as the exclusive source of nitrogen for several years on acid soil, it increases the acidity, until finally most agricultural plants fail to thrive satisfactorily. It is possible, nevertheless, to employ such proportions of both nitrate of soda and sulphate of ammonia that the injurious consequences following the continuous use of each may be avoided, for one neutralizes the bad effect of the other. The skillful manufacturer endeavors to compound these and the organic ammoniates, so as to best adapt the fertilizer to the production of certain special crops and to various types of soil.

While it is true that many kinds of plants can take up some nitrogen in the form of ammonia, it is, nevertheless, a fact that a very large part of what the plant uses is actually changed into nitric acid and nitrates. Because most of the nitrogen in ammonium salts goes through this change before the plants use it, it is not quite as quick in its action as nitrogen in nitrates. It possesses, however, a very distinct advantage over the latter forms for the reason that the ammonia enters into chemical combination with constituents of the soil, and consequently the rain cannot so readily leach it away. Notwithstanding this fixation, the ammonia is nevertheless changed so rapidly into nitrates later on that the ammonium salts take second rank in availability as sources of nitrogen.

Recently, calcium cyanamide has been produced in this country to some extent. It is, however, very disagreeable material to handle, and in mixed fertilizers it is seldom used to the extent of more than 50 to 75 pounds to the ton. If calcium cyanamide is applied by itself to the soil in considerable quantity, it is likely for the first two to three weeks to exert an injurious effect; hence if it is used at all, it should be applied at least three weeks before planting.

The great source of nitrogen, aside from those already mentioned, is the so-called "organic" materials. The most quickly available of these is dried blood, but the quantity of it produced in the entire country is so small that it is of minor importance. Another excellent but very limited source of nitrogen is dried fish waste. The largest, and yet a very good source of organic nitrogen is ordinary meat tannage. This should not be confused with garbage tannage, for the latter contains a very low percentage of nitrogen, and it is very slowly available to plants.

There are also several very inferior sources of organic nitrogen, such as untreated hair, wool waste, roasted and unroasted leather and other materials of similar character. Several years ago some states placed restrictions on the use of these materials in fertilizer,

or if used, the manufacturers were obliged to state the fact on the fertilizer label. It is, however, possible to treat these materials in such a manner that all of the nitrogen is made equal in efficiency to that in the best fertilizer ingredients. By the chemical treatment the nitrogen may be changed into sulphate of ammonia or the large molecules of nitrogenous character contained in these crude ammoniates are broken up into much smaller ones known by chemists as acid amines and amino acids. Recent investigations by government chemists and others have shown that these latter compounds can be assimilated directly by the plant to some extent, without being first transformed into ammonia and nitric acid. Furthermore, ammonia and nitrates are formed from these compounds as rapidly, or even more rapidly, than from dried blood.

Obviously, therefore, it is immaterial to the consumer of fertilizer what the original source of the organic nitrogen may have been, provided it is in highly available form as he buys it. Fortunately, the chemists have already devised special methods of analysis which show satisfactorily the availability of the organic nitrogen. The utilization of such materials when properly treated is desirable from every standpoint, for it aids in keeping down the price of other sources of nitrogen, just as more potatoes, onions and wheat would keep the price of them down at present if we could get enough from any available source.

Owing to the fact that the major portion of the nitrogen in organic materials is changed into ammonia, and finally into nitrates, before it is taken up by the plants, it is a little slower in its action than either ammonium salts or nitrates. The use of nitrogen in organic materials in conjunction with nitrates and ammonium salts makes an ideal combination, and the organic matter also has the advantage of not being readily washed out of the soil.

The ideal fertilizer for use on most soils is one containing some nitrogen from all three of these important sources, in order that the supply to the plant may be continuous as needed.

It is important, from the standpoint of the vegetable grower, that the phosphoric acid in fertilizers be very largely in soluble and available form. The chief sources of such phosphoric acid in former times were dissolved bone black, dissolved bone, and acidulated tankage. At present, however, most of the soluble and available phosphoric acid for fertilizers is supplied in superphosphate, also known as acid phosphate. There is a very great advantage when growing truck crops, in using fertilizers in which the phosphoric acid is supplied from this source, for the growth of the plants must be pushed as rapidly as possible.

Attempts have been made, in certain parts of the country, to use raw rock phosphate as a source of phosphoric acid, but the experience of growers and experimenters, almost without exception, is to the effect that for general truck crops the use of raw rock phosphate should be emphatically discouraged. In fact, with the exception of certain black corn-belt soils of Illinois, it has not

given good results, generally, with ordinary farm crops, even when grown under the most approved systems of extensive farming.

Recently, Professor Mooers in speaking of his investigations in Tennessee says:

"In reply to your recent inquiry will say that we have not published anything recently with regard to the comparative values of acid phosphate and rock phosphate, but we have conducted experiments with these two materials on various types of soil in different parts of the State for the past ten years. The results of our experimental work do not allow us to recommend raw rock phosphate for general use. In fact, we discourage its use anywhere in the State and recommend acid phosphate as the most profitable of all phosphates. In some of our experimental work the raw rock has given profitable returns, but in no instance clearly equal to acid phosphate. In all of the experiments the two materials have been used in approximately equal money values and in connection with green manuring, which is supposed by some to increase appreciably the availability of rock phosphate.

"In some of our experiments conducted on soils especially poor in phosphoric acid the returns from the rock phosphate have been very meager and not at all comparable with those from acid phosphate. For us to give the preference to rock phosphate would be to ignore all of our experimental data. I may add that when the land is limed the acid phosphate shows considerably greater superiority over the rock phosphate than where unlimed."

In Indiana the results with raw rock phosphate have been even more unfavorable (Indiana Agricultural Experiment Station Bulletin No. 187, by A. T. Wiancko and S. D. Conner), as shown by the following statement:

"In a general summary of all the experiments of the Station during thirteen years, in which eighty-two tests were made, it appears that:

"The per-acre net profit has been over six times as great from acid phosphate as from rock phosphate.

"The per-dollar invested profit has been over seven times as great from acid phosphate as from rock phosphate.

"The value of the crop increase per pound of phosphorus applied has been twenty-eight and one-third cents for the acid phosphate and three and one-half cents for the rock phosphate."

More recently, Director C. E. Thorne of the Ohio Experiment Station has made a careful study of the work with raw rock phosphate and acid phosphate at the various agricultural experiment stations in the United States, and he also gives a review of his own extensive experiments on the subject. His conclusion is as follows:

"In the foregoing pages is presented a brief review of the principal experiments thus far reported in the comparison of finely ground, raw phosphate rock with acid phosphate, together with a more extended report of similar comparisons made by this Station.

"These experiments show conclusively that raw phosphate rock may be used with profit on land that is materially deficient in available phosphorus, but as a rule acid phosphate has proved to be not only a more effective but also a more economical carrier of phosphorus to crops under conditions which render the freight charges a relatively large part of the cost of the fertilizer.

"Where a different outcome has resulted it is usually found that one or both of the phosphate carriers have been used in such large quantity as to furnish more available phosphorus than the crops were able to utilize, thus making a comparative measurement of the effect of the two carriers impossible."

The chief sources of potash, before the war, were muriate of potash, high-grade sulphate of potash, double manure salt (double

sulphate of potash and magnesia), and kainit, derived directly or indirectly from the German mines. In some cases potash in carbonate of potash has been used in tobacco fertilizers. This is chiefly a manufactured product, although some is obtained by leaching wood ashes. Nitrate of potash has also been used to slight extent as a source of potash.

At present, potash is available only in very small quantities for fertilizer purposes. It is being obtained from the waters of lakes in Nebraska, California, Utah and elsewhere, and a little is being secured from evaporated sea water. Sulphate of potash is being manufactured to some extent from alunite. Feldspar and a few other minerals also yield some potash. Small quantities of potash are recovered from the flue dust of cement works, from the burning of sagebrush, from the giant kelps of the Pacific Coast, from corn cobs, banana stems, the seaweeds of the Atlantic Coast, and from various other miscellaneous materials.

For sugar beets if grown for their sugar, for tobacco for wrapper and binder purposes, for potatoes grown for their starch, and for certain other crops, muriate of potash and kainit should either be avoided or they should be applied to the land a year in advance of the time when these crops are to be grown. These particular potash salts are objectionable because they contain large amounts of chlorine. In Germany the application of them for the potato and sugar beet crops a year in advance is a common or frequent practice. When used in this way, sufficient time is allowed for the chlorine to combine with lime and magnesia and be leached away.

Frequently buyers will dicker for a long time in the attempt to save a dollar or two a ton in the price of fertilizer, and overlook entirely the possible difference in its efficiency. In the course of experiments with potatoes in Maine during the past four years, I have compounded fertilizers having the same percentages of ammonia, available phosphoric acid, and potash, which have nevertheless varied in their crop-producing power to an extent equivalent to from 30 to 40 bushels of potatoes to the acre. Similar, but less striking, differences result in growing oats, rye, wheat or corn.

In connection with the fertilization of cranberries, I have found that fertilizers, having the same analysis, varied in efficiency to such an extent as to make a difference of \$45.00 an acre in the value of the crop. The question of efficiency, therefore, in fertilizers hinges upon the mode of manufacture and the adaptability of the ingredients used to the special soil and crop. In the light of such experience, the most important thing from the standpoint of the grower is that the fertilizer shall be compounded on a sound and scientific basis, and secondly, it should remain in good physical condition for handling and drilling when stored under suitable conditions, for some time.

THE VEGETABLE SHOW

The month of January is not an ideal time for a vegetable exhibit in the State of Pennsylvania, but, nevertheless, it is possible to keep, by ordinary methods of storage, a great many different kinds of vegetables. In addition, there are the forced vegetables from the greenhouse. In view of these possibilities, a premium list to the value of \$80.00 was secured by soliciting the interests of various firms. The following very generously contributed and made the exhibit possible:

W. Atlee Burpee & Co., Philadelphia, Pa., \$25.00; Lord & Burnham Co., New York City, \$20.00; W. S. Schell, Harrisburg, Pa., \$10.00; Holmes Seed Co., Harrisburg, Pa., seeds to value of \$10.00; G. B. Pratt Co., New York City, 5 gallons Sulfocide; Pennsylvania Farmer, \$5.00.

The response, on the part of the growers of the State, was far from being gratifying. The value of the vegetables grown in Pennsylvania is considerably more than the value of the apples; and yet the fruit exhibit occupied a space 20 times as great as that required for the vegetables. But in view of the fact that this was the first real attempt to stage a vegetable show in connection with the annual January meeting, we should not be discouraged. Let us hope that the vegetable interest will be better represented in another year. Exhibits of this sort, we should remember, are most excellent means of exchanging and comparing ideals.

The following is a list of the exhibitors and prize winners:

S. Herbert Starkey, Bustleton, Pa., 1 doz. bunch celery, first prize; flat bunch celery, first prize; 10 carrots, first prize; 10 beets, first prize.

W. J. Schubauer, Harrisburg, Pa., 1 doz. celery, second prize; 10 turnips, second prize; 10 carrots, no prize.

Lakeside Gardens, East Stroudsburg, Pa., 10 onions, second prize.

J. A. Smyser, Harrisburg, Pa., Irish Cobbler Potatoes, first prize.

T. H. Wittkorn, Media, Pa., Irish Cobbler Potatoes, second prize; Gold Coin Potatoes, no prize.

Benjamin Harris, Newtown, Pa., Russet potatoes, first prize. Cape May Early Potatoes, no prize.

J. A. Shuey, New Cumberland, Pa., Russet Potatoes, second prize.

R. P. Lovett, Fallsington, Pa., World's Wonder Potatoes, first prize; cauliflower, first prize; turnips, first prize.

Agnes Cunningham, Newtown, Pa., package Greenhouse Tomatoes, first prize.

R. J. Walton, Hummelstown, Pa., vegetable display, first prize.

R. H. Garrahan, Kingston, Pa., flat bunch celery, second prize.

H. F. Hershey, Harrisburg, Pa., 1 doz. bunch celery, no prize.

Jednota Farms, Middletown, Pa., carrots and turnips, no prize.

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END OF YEAR